Appendix J
Quality Assurance Project Plan

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Section I. Introduction

1. Background.

a. The mission for developing the facilities, testing, and improving new and unique demilitarization processes and equipment required to destroy obsolete chemical munitions is assigned to the Chemical Agent Munitions Disposal System (CAMDS) at the Deseret Chemical Depot (DCD) in Stockton, Utah. CAMDS is responsible for conducting trial burns and is the principal data user and decision maker for the trial burns.

b. CAMDS will subcontract the sampling and analysis for the Metals Part Furnace (MPF) Performance Trial Burn. This support will include the performance of gas sampling, collection of selected process samples, transportation of samples to the laboratory, sample analysis, Quality Assurance/Quality Control (QA/QC) associated with these tasks, and reporting of the results.

c. The Test Contractor will provide in-process approvals with final acceptance and approval by CAMDS. CAMDS will be responsible for the collection of certain monitoring information and collection and analysis of agent feed samples, and the collection of system operating data.

2. Methodology.

a. The project organization is summarized in Figure 1-1.

(1) The Test Contractor Principal-in-Charge will commit the resources to the project and be responsible for resolving major problems if they occur. The QA Officer will report to the Test Contractor Principal-in-Charge and be responsible for enforcing the Sampling Standing Operating Procedures (SSOP) and protocols of the Quality Assurance Project Plan (QAPP).

(2) The Field QC Coordinator will report to the QA Officer and observe all on-site activities to ensure that the SSOP and the QAPP are being followed. The Field QC Coordinator will coordinate with the Test Contractor Project Manager (PM).

(3) The PM is responsible for all on-site work and completion of the data collection, lab analysis, gas sampling data, emission quantification calculations, and reporting the results. The PM is also responsible for overseeing the required sampling and ensuring that the samples are taken to the laboratory.

(4) The CAMDS Stack Sampling Coordinator and Contract Officer's Representative (COR) will be available to coordinate with the PM including changes in any sampling or analytical procedures.

b. The PM will be responsible for direct supervision of the gas sampling teams, equipment, transportation, set up, calibration, sample train operations, pre- and post-test leak checks, isokinetic checks, train breakdown, and gas sample recovery.

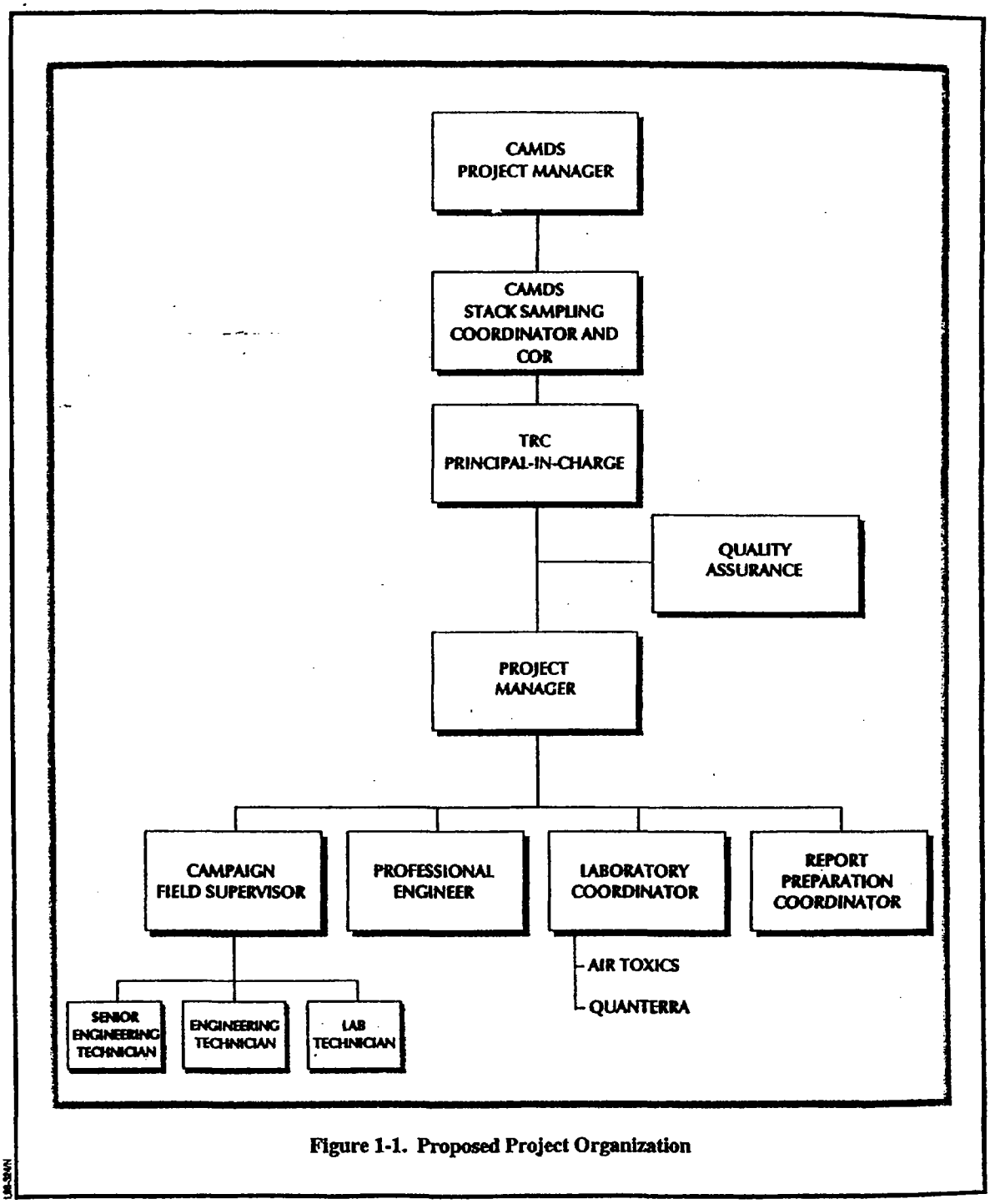


Figure 1-1. Proposed Project Organization

Figure 1-1. Project Organization Chart

c. Each team will include a team leader and technician. The leader will be responsible for operation of the testing equipment, QA/QC, and record keeping for his/her particular train. The team leader reports any irregularities to the PM. The PM will report any sampling problems to the CAMDS COR and the Test Contractor Principal-in-Charge.

d. The Laboratory Services Coordinator will oversee all analytical activities and ensure that the samples are analyzed according to the methods and procedures specified in the Sampling Standing Operating Procedures.

e. This project management structure anticipates the direct personal responsibility for each task and provides the mechanism for review and corrective action. The direct supervisory line of responsibility also provides for flexibility and timely action to correct problems.

Section II. Program Definition

1. Background.

a. The CAMDS facility, located at DCD in Stockton, Utah consists of three incineration systems. These incinerators include: the liquid incinerator (LIC), the metal parts furnace (MPF), and the deactivation furnace system (DFS). The brine dryer system (BDS) supports site operations through the drying or reduction of scrubber brines down to solid form for disposal offsite. CAMDS is designed to dispose of nerve agents (GB and VX), blister agent (mustard, H-series), drained munitions, contaminated refuse, bulk containers, liquid wastes, explosives, propellant components and other agent related generated waste.

b. Chemical agent munitions, including mines, projectiles, and bulk agent ton containers are stored in bunkers located in the Deseret Chemical Depot. This area is secured by the Army under 24-hour electronic surveillance and armed guard. The CAMDS facility is situated adjacent to this storage facility, minimizing the distance munitions are transported.

c. The trial burn testing for which this QAPP and the associated Sampling Standing Operating Procedures (SSOP) are written is for the MPF HD Trial Burn. The Plans describe in detail the sampling and analytical activities that will be performed by the sampling contractor and laboratory during the trial burn performance tests.

Section III. Project/Task Description

1. The MPF is designed to meet RCRA regulation performance requirements (40 CFR Part 264).

2. During the MPF Trial Burn, exhaust gas emissions testing will be conducted for oxygen (O2), carbon monoxide (CO), carbon dioxide (CO2), particulate matter (PM), hydrogen fluoride (HF), hydrogen chloride (HCl), chlorine (Cl2), metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans (PCDDs/PCDFs), and total organic compounds (TOCs). Identification of Products of Incomplete Combustion (PICs) will be performed using Methods 5041 and 8270C for all performance runs.

3. The metals to be analyzed in the exhaust gas are taken from the Health Risk Assessment (HRA). These metals are aluminum (Al), antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), boron (B), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), phosphorus (P), selenium (Se), silver (Ag), thallium (Tl), tin (Sn), vanadium (V), and zinc (Zn). Principle Organic Hazardous Constituents (POHCs) will be surrogate compounds specified in the incinerator test plan.

4. Process samples, wet scrubber recirculation brine (brine) and process water will be tested for HRA metals, Toxicity Characteristic Leaching Procedure (TCLP) constituents (metals, VOCs, SVOCs, pesticides, herbicides), Specific Gravity, Free Liquids, Reactivity (scrubber only), Sodium Salts, and pH. Samples of residues (ash) will be analyzed for Reactivity, TCLP constituents, and Dioxins/Furans.

5. The surrogate trial burn is designed to demonstrate the DRE under conditions that will apply during the actual operating conditions.

6. Scheduling for the project is found in the Test Plan and will be updated as necessary. An example of a daily sample run schedule is found in the Sampling Standing Operating Procedures.

7. Individual project and quality records are identified in the Sampling Standing Operating Procedures and this QAPP. Examples of the Calibration Data Sheets, Isokinetic Run Sheets, and Chain-of-Custody (COC) Records are found in Attachment A. The QA/QC objectives for the analytical data are found in Attachment B.

Section IV. Data Quality Objectives for Measurement Data

1. The overall objective of the measurement data for each test is to demonstrate compliance with the RCRA permit and demonstrate an acceptable DRE.

2. Specific objectives of the MPF Trial Burn are as follows:

a. To demonstrate the ability of the MPF to meet the regulatory requirements while maintaining steady state operation and a stable feed rate of the designated chemical agent.

b. Demonstrate a DRE of 99.99 percent for the surrogate POHC.

c. Demonstrate particulate emissions from the PAS outlet stack are less than or equal to 180 mg/m3, corrected to 7% O2.

d. Demonstrate PM10 emissions from the PAS outlet stack are less than or equal to 0.24 lbs/hr or 0.016 gr/dscf.

e. Demonstrate HCl emissions from the PAS outlet stack are less than or equal to 4 lbs/hr, or one percent of the HCl in the combustion gas streams prior to control, whichever is greater.

f. Demonstrate the HRA metals emissions are less than or equal to the Tier II emissions levels as listed in 40 CFR Part 266.106.

g. Demonstrate carbon monoxide (CO) concentrations are less than or equal to 100 ppmv, dry, corrected to 7% O2, over a 1-hour rolling average.

Section V. Project Narrative

1. The incinerator systems must demonstrate an ability to effectively treat the designated hazardous waste such that human health and the environment are protected. Section 3004 of RCRA (1976) requires the promulgation of performance standards which establish the levels of environmental protection that hazardous waste TSDFs must achieve and mandates the criteria against which applications for permits must be measured. At this site, the trial burns will be performed to demonstrate the operating parameters necessary for the incinerator system to meet the required performance standards. The data obtained during the trial burns will demonstrate compliance to regulations.

2. When identified analyses and the DRE fall within stated parameters of each system's Performance Test Plan, SSOP, and this QAPP, the trial burn will be considered successful.

3. Throughout the overall program, the sampling contractor will utilize EPA-approved sampling protocols. A more detailed explanation of the sampling and analytical methods can be found in the accompanying SSOP. The SSOP describes the sample types, sampling locations, sample handling and custody requirements, and analytical methods used.

4. The analytical laboratory will utilize EPA-approved analytical methods. The samples analyzed will include field blanks, laboratory blanks, laboratory control samples, and duplicate samples. Table 10-2 lists the field blanks to be collected. One set of process samples will be collected in duplicate.

5. Standard sampling and analytical instrumentation will be utilized and will meet or exceed EPA requirements. An independent peer review is not anticipated as part of this scope of work. A final readiness review will be performed by the Test Contractor to assure their organization has the appropriate manpower, equipment, and training in place prior to commencement of the trial burns.

Section VI. Special Training Requirements/Certification

1. Training requirements are established at CAMDS.

   a. The training program will train the facility personnel how to perform their duties by providing classroom instruction, hands-on training equipment, and on-the-job training. The program provides for both initial and annual refresher training relevant to employees' job positions within the facility for management of hazardous waste that includes, but is not limited to, personnel that handle, move, perform maintenance on, or operate hazardous waste management equipment.

   b. The program provides facility personnel with training relevant to their positions to respond effectively to emergencies, and familiarization with emergency procedures, emergency equipment, emergency systems, and implementation of the facility contingency plan.

   c. Relevant to the employees' duties, instruction will be provided in hazardous waste management procedures to ensure compliance with the treatment and storage permit.

   d. Included in the training will be an assessment of each individual to determine if they have successfully completed the training program and can effectively perform their duties.

2. Sampling contractor personnel will receive on-site training before they will be allowed into the CAMDS facility. The sampling personnel will be trained in their job by the sampling contractor.

Section VII. Documentation

1. Reports and documentation, as identified in Section 18.0 of this QAPP and Section 4.7 of the SSOP are produced by the Test Contractor and their subcontractors. They will be submitted to CAMDS and the State of Utah for final approval.

2. Supporting documents will be kept on file by CAMDS.

3. The final Performance and Compliance Test Reports will be submitted to the DSHW for final approval. These Test Reports will include copies of the field data sheets and calculations, analytical raw data and calculations, plant process data, and summaries of the data.

Section VIII. Sampling Process Design and Sampling Method Requirements

1. A detailed explanation of the sampling and analytical methods used for the Performance Test can be found in the SSOP. Throughout the overall program, the Test Contractor will utilize EPA-approved sampling protocols. If a deviation from the sampling and analysis methods is required, prior approval must be obtained from the CAMDS COR who will discuss it with DSHW. Any deviations from the specified protocols will be documented in the final report.

2. As presently configured, the MPF performance test will entail conducting one baseline and three performance runs. Each planned sampling series is referred to as a performance run. Three performance runs for the incinerator system are necessary for a successful Trial Burn. The SSOP contains a description of the protocols for gas sampling, residue sampling, the duct description, dimensions and sampling locations, and alternate gas sampling ports.

3. All measurements are required to meet project objectives and therefore, are classified as critical.

Section IX. Sample Handling and Custody Requirements

1. The purpose of COC procedures is to document the identity of the sample and its handling from its existence through all transfers of custody until it is transferred to the analytical laboratory and undergoes analysis and data reduction. Internal laboratory records document the custody of the sample through its final disposition.

2. All samples will be collected by the Test Contractor who will label the samples following a designated code system for this project. An example sample label is shown in Attachment A.

a. The code system will be developed by the Test Contractor to meet the requirements listed in the Work Plan. All samples are sealed and the volume of the sample is marked. All data for each sample run are recorded on a run sheet during each performance run. After each run, the data are checked for completeness.

b. The sampling contractor will then complete the appropriate COC forms to be sent to the laboratory. Examples of the Test Contractor's COC forms and other sampling documentation can be found in Attachment A. The information to be recorded on each sample is found in the SSOP, Section 3.7.

c. The samples will then be packaged for shipment. A designated field technician will take custody, sign the COC forms, and deliver the samples to the laboratory.

d. The field technician will sign the appropriate forms relinquishing custody and the laboratory representative will sign the form indicating that they have taken custody of the samples.

3. When a sample arrives at the laboratory, it will be received by an individual with the COC authority who is trained in the laboratory's sample receiving and control methods.

a. The sample coolers will be opened by the sample custodian or their designee, and logged into the master sample log.

b. A laboratory internal COC form will be completed and the sample will be placed in locked storage. Laboratory analysts will sign out samples prior to analysis.

c. A standard form will be used by the sample custodian to record the location of the sample and any transfers of the sample to analytical personnel. This form will remain in the custody of the laboratory sample custodian until completion of the project, at which time they will be transferred to document control for filing with the project file when required.

Section X. Analytical Method Requirements

1. This section describes the analytical protocols that will be used to analyze the samples collected during the Trial Burns and Compliance Tests. Table 10-1 presents a summary of the analytical methods to be used. A more detailed description of the methodologies can be found in the SSOP. The QA procedures for the Performance Test will follow the basic guidelines given in the methods or the EPA handbook: QA/QC Procedures for Hazardous Waste Incineration. Should a failure in the analytical system occur, the laboratory will immediately notify the Test Contractor and the Test Contractor will notify CAMDS. Corrective action will be as directed by CAMDS.

2. The main functions of the laboratory include: preparation or purchase of the sorbent (Tenax™, Anasorb 747™, and XAD-2™) for the gas sampling, QC samples preparation, and analysis of the samples. Laboratory QC samples will include method blanks, blank spikes (calibration checks and laboratory control samples), matrix spikes, and replicates. These will be performed as required by the methods, or at least one round of samples per batch and one round every twenty samples. The field blank will be a sampling train assembled in the field, leak checked, let stand (including heating of the probe, filter housing) for the sample time, then recovered as other trains. Table 10-

2 presents the expected number of field samples sent for analysis. This table assumes the following:

a. Method 0031 (SMVOC) samples. Four tube sets and a single condensate collected for 40 minutes for a total of 160 minutes, plus a field blank pair for each run and a trip blank pair for each shipment of samples. Analysis will be for VOCs. The trip blanks will only be analyzed if compounds above acceptable (background) levels are detected in the field blank.

b. Method 0010 samples - One set of samples per run plus one field blank per Trial Burn/Compliance Test. Analysis will be for SVOCs .

c. Method 0023A samples. One set of samples per run plus one field blank per Trial Burn/Compliance Test. Analysis will be for PCDDs/PCDFs.

d. Method 0010 samples. One set of samples per run plus one field blank per Trial Burn/Compliance Test. Analysis will be for Semi-Volatile Total Organic Compounds (SVTOCs) and Non-Volatile Total Organic Compounds (NVTOCs).

e. Method 0060 samples. One set of samples per run plus one field blank per Trial Burn/Compliance Test. Analysis will be for the HRA metals and phosphorus.

f. Method 0050 samples. One set of samples per run plus one field blank per Trial Burn/Compliance Test. Analysis will be for HF, HCl, Cl_2.

g. Method 5i samples . One duplicate set of samples per run plus one field blank per Trial Burn/Compliance Test. Analysis will be for PM. Method 5i samples will be collected in conjunction with the Method 0050 train.

h. Method 0040 samples. One set of samples per run consisting of two field (Tedlar bag) samples and a field blank. Analysis will be for Volatile Total Organic Compounds (VTOCs).

i. Residue samples. Ash samples will be taken from the MPF trays at the end of each run and analyzed for reactivity, Dioxins/Furans, and full TCLP constituents.

j. Liquid Samples. Three brine samples will be collected for all Runs. The first brine sample will be collected one hour after sampling begins. The second sample will be collected at port change and the third sample will be collected during the last 60 minutes of the run.. Samples of the process water will be collected once per Trial Burn. The liquid samples will be analyzed for HRA metals, full TCLP constituents (metals, VOCs, SVOCs), reactivity, and pH, and PCDDs/PCDFs for brine only.

3. Selected compounds are spiked into various parts of the analytical method analysis scheme. Spiking locations are specified by in the referenced methods. Acceptance criteria for each method application specified below is presented in Attachment B.

For Method 5041A (SMVOC) and 8260B the following are specified:

Application	Compounds	Spiking Location
Surrogates:	Bromofluorobenzene, 1,2-Dichloroethane-d4, and Toluene-d8	tubes, condensate & field sample purge vessel
Internal Standards:	Fluorobenzene, Chlorobenzene-d5, and 1,4-Difluorobenzene	Purge vessel
Matrix Spikes:	1,1-Dichloroethene, Benzene, Chlorobenzene, Toluene, and Trichloroethene, Tetrachloroethene	Blank tubes, condensate & field sample purge vessel
Instrument:	GC/MS	

For Method 0010/8270C the following are specified:

Application	Compounds	Spiking Location
Surrogates:	2,4,6-Tribromophenol, 2-Fluorobiphenyl, 2-Fluorophenol, Nitrobenzene-d5, Phenol-d5, and Terphenyl-d14	Extraction Device
Internal Standards:	1,4-Dichlorobenzene-d4, Naphthalene-d8, Perylene-d12, Acenaphthene-d10, Phenanthrene-d10, and Chrysene-d12	Sample Vials
Matrix Spikes:	Acenaphthene, 2,4-Dinitrotoluene, pyrene, 1,4-Dichlorobenzene, 1,2,4-Trichlorobenzene, Hexachloroethane	Extraction Device
Instrument:	GC/MS	

For Method 0023A/8290 the following are specified:

Application	Compounds	Spiking Location
Surrogate Standards:	$^{37}Cl_4$-2,3,7,8-TCDD, $^{13}C_{12}$-1,2,3,4,7,8-HxCDD, $^{13}C_{12}$-2,3,4,7,8-PeCDF, $^{13}C_{12}$-1,2,3,4,7,8-HxCDF, $^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	XAD-2 Resin, Extraction vessel
Internal Standards:	$^{13}C_{12}$-2,3,7,8-TCDD, $^{13}C_{12}$-1,2,3,7,8-PeCDD, $^{13}C_{12}$-1,2,3,6,7,8-HxCDD, $^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD, $^{13}C_{12}$-OCDD, $^{13}C_{12}$-2,3,7,8-TCDF, $^{13}C_{12}$-1,2,3,7,8-PeCDF, $^{13}C_{12}$-1,2,3,6,7,8-HxCDF, $^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF, $^{13}C_{12}$-OCDF	Autosampler vial
Recovery Standards:	$^{13}C_{12}$-1,2,3,4-TCDD, $^{13}C_{12}$-1,2,3,7,8,9-HxCDD	Extraction vessel
Instrument:	HRGC/HRMS	

Table 10-1. Analytical Methods

Parameter	Matrix	Preparation	Analysis Method
VOCs	SMVOC Tubes and Condensate	5041A/5030B	5041A/8260B
SVOCs	XAD-2™/filter/condensate/rinsate	3542	8270C
SVTOCs and NVTOCs	XAD-2™/filter/condensate/rinsate	3542	GC/FID and Gravimetric
Total Particulate Matter	Filter/Probe rinse	Method 5i	Method 5i
PCDDs/PCDFs	XAD-2™/filter/rinsate	0023A	0023A/8290
VTOCs	Bag/condensate	0040/5030A	GC/FID
HF, HCl, and Cl_2	Impinger solutions	9057	9057
HRA Metals and Phosphorus	Filter, rinsate, impinger solution	0060	6020, 7470A
COD	Ash, Brine	Method 410.1/.2	Method 410.1/.2
Reactive Cyanide	Ash, Brine	Chapter 7 Sec.7.3.3.2	9014
Reactive Sulfide	Ash, Brine	Chapter 7 Sec. 7.3.4.2	9034
TCLP VOCs	Slag/Brine - TCLP leachate	1311/5030B	8260B
TCLP SVOCs	Brine/water - TCLP leachate	1311/3510C/3540C	8270C
TCLP Herbicides	Brine/water - TCLP leachate	1311/8151A	8151A
TCLP Pesticides	Brine/water - TCLP leachate	1311/3510	8081
PCDDs/PCDFs	Brine	8290	8290
pH	Brine/water/residue	9095A/ASTM D1429	9095A/ASTM D1429
TCLP HRA Metals	Ash- TCLP leachate	1311/3010A/7470A	6010B/7470A

Table 10-2. Number of Samples

SAMPLE	MPF Trial Burn	Field DUPs (per Burn)	Field Blank (per test)	Trip Blank (perburn)
Method 0031	28	0	7	1
Method 0040	14	0	7	2
Method 0010-SVOCs	7	0	1	0
Method 0010-TOCs	7	0	1	0
Method 5i	14	0	1	0
Method 0023A	7	0	1	0
Method 0060	7	0	1	0
Method 0050	7	0	1	0
Ash	7	1	0	0
Brine	7	1	0	0
Process Water	1	1	0	0

Method blanks, blank spikes, matrix spikes, and replicates will be performed according to the methods. Trip blanks are collected for only volatile organic compounds.

Section XI. Quality Control Requirement

QC checks are performed to ensure the collection of representative samples and the generation of valid analytical results on these samples. These checks will be performed by the project participants throughout the program under the guidance of the QA manager and the field and laboratory coordinators.

1. Data Collection and Sampling QC Procedures. QC checks for the process data collection and sampling aspects of this program will include, but are not limited to, the following:

a. Use of standardized forms and field notebooks to ensure completeness, traceability, and comparability of the process information and samples collected.

b. Field checking of standardized forms by a second person to ensure accuracy and completeness.

c. Strict adherence to the sample traceability procedures (i.e. chain-of-custody) outlined in Section 3.7 of the SSOP.

d. Submission of field-biased blanks.

e. Leak checks of sample trains before, during port change, and after sample collection.

2. Sampling Equipment QC Checks and Frequency.

Calibration of the field sampling equipment will be performed prior to and at the conclusion of the field sampling effort as required by the applicable EPA methods. Copies of the calibration sheets will be provided to CAMDS by the Test Contractor when the Test Contractor arrives on site. The Test Contractor will maintain an up-to-date list of sampling equipment including serial number and pertinent calibration data. Post-test calibrations and equipment checks will be provided to CAMDS before the Test Contractor removes the equipment from the site. Leak checks of the sample trains will be conducted in accordance with the protocol called for in each method. Leak checks will be conducted at the start and completion of testing, and at each port change. DSHW will have the option of observing all of the leak checks.

3. Sample Collection QC Checks.

Field biased blanks of reagents and collection media (de-ionized water, filters, impinger solutions, SMVOC tubes, XAD traps etc.) will be placed in appropriately cleaned and sized sample containers in the field and handled in the same way as actual field samples, to provide a QC check on sample handling.

4. Analytical Procedures For Laboratory Samples. A number of different types of QC samples will document the validity of the generated data. The following types of QC samples will be used during the program.

a. QC Samples and Blanks

(1) Method Blanks - method blanks contain all the reagents used in the preparation and analysis of samples and are processed through the entire analytical scheme to assess spurious contamination arising from reagents, glassware, and other materials.

(2) Field Blanks - field blanks contain all the reagents used during the sample collection process. The sample trains are recovered and analyzed according to the relevant method. The field blank samples will be collected during the Trial Burn/Compliance Test. The field blank will be a sampling train assembled in the field, leak checked, let stand with probe and filter housing heated for the sample time, then recovered as other trains. The DSHW staff will be notified when the field blanks will be collected to allow them the opportunity to observe the collection of the field blank.

(3) Calibration Check Samples - One of the working calibration standards is periodically used to check that the original calibration is still valid.

(4) Laboratory Control Samples (LCS) - These samples are generated from spikes prepared independently from the calibration concentrates. The LCS are used to establish that an instrument or procedure is in control. An LCS is carried through the entire sample preparation and analysis procedure.

(5) Matrix Spikes - Often samples are spiked with the analyte of interest and then analyzed to determine a percent recovery. It is anticipated that these analyses would assess the behavior of actual analyses in individual program samples during the entire preparative and analysis scheme.

(6) See Section 10.0 for the anticipated minimum number of QC samples. The percent recovery of each matrix will be calculated as noted in Section 20.0. The following guidelines will be used in evaluating the data:

(a) All recovery data will be evaluated to determine if the QC limits are being achieved

(b) Trends in the data will also be evaluated using the following criteria:

1 All recovery values in any one analysis are outside the established limits,

2 Over 50% of the values for a given sample set are outside limits, or,

3 One compound is outside the limits in over 50% of the samples.

(c) All recovery data which are outside the established limits will be evaluated by the following methods:

1 All values that fall outside the QC limits described in the analytical method will be noted.

2 An independent check of the calculation will be made.

3 The method will be evaluated for problem areas.

4 Corrective actions will be taken for problems identified.

5 If feasible, samples will be rerun after corrective action is complete.

(7) The results from the evaluation will be included in the final report.

b. Reagents used in the laboratory are normally of analytical reagent grade or higher purity; each lot of acid or solvent used is checked for acceptability prior to laboratory use.

(1) All reagents are labeled with the date received and the date opened.

(2) The quality of the laboratory's deionized water is routinely checked.

(3) All glassware used in the sampling and analysis procedures are pre-cleaned according to the method requirements.

(4) Standard laboratory practices for laboratory cleanliness, personnel training, and other general requirements will be used.

(5) The results of these QC procedures will be included in the final report.

5. QC of Sorbents

a. Sorbents used for the M0031 sampling will be purchased precleaned from the vendor and provided by the laboratory.

(1) The sorbents will be verified clean by the laboratory prior to sampling.

(2) The Tenax™ and Anasorb747™ will then be placed into pre-cleaned 15 X 100 mm glass tubes and held in place with glass wool plugs.

(3) Each tube will be conditioned at 250°C (±20°C) with a 20 mL flow of ultra high purity helium or nitrogen. The conditioning time will consist of 4 hours of heat, at least 4 hours of cooling, followed by 4 more hours of heat.

(4) Tubes will then be placed into 25 X 150 mm, clean culture tubes while still hot.

b. The quality of the Method 0031 tubes will be verified by GC/MS. A blank Tenax™ and Anasorb747 cartridge will be thermally desorbed into the GC/MS. The Tube batch will not be considered acceptable if there is more than 50 ng of any priority pollutant.

c. The XAD-2™ resin traps for the semi-volatile organics train will be purchased precleaned by the laboratory and be provided to the sampling contractor. The sorbent will be verified clean by the laboratory prior to sampling. If required, the contracted laboratory will employ the following pre-cleaning steps. The XAD-2™ resin will be subjected to an initial double DI water rinse in accordance with the method.

d. After these rinses are completed the resin shall be placed inside a soxhlet extractor with a glass wool plug and then will be subjected to the following series of extractions:

(1) DI Water	8 hours
(2) Methanol	22 hours
(3) Methylene Chloride	22 hours

e. The quality of the XAD will be verified by GC/MS. The resin used for the PCDD/ PCDF sampling will be analyzed by HRGC/HRMS to ensure the resin is useable.

Section XII. Instrument/Equipment Testing, Inspection, and Maintenance Requirements

1. The sampling contractor will follow an orderly program of positive actions to prevent the failure of equipment or instruments during use. This preventative maintenance and careful calibration helps to assure accurate measurements from field and laboratory instruments.

2. All equipment that is scheduled for field use will be cleaned and checked prior to calibration. Once the equipment has been calibrated, sample trains are assembled and leak checked in order to reduce problems in the field. An adequate supply of spare parts will be available in the field to minimize downtime from equipment failure.

3. The CAMDS CEMS systems are operated and maintained in accordance with the applicable manuals. Maintenance is performed on a regularly scheduled basis prior to use in the field and includes, but is not limited to, purging of sample lines, checking pump oil and belts, cleaning rotameters or other sample flow monitoring devices, checking sample capillaries and mirrors, etc. Routine maintenance procedures are critical for ensuring the continuous, trouble-free operation of the CEMS in adverse environments.

4. The subcontractor laboratories will maintain their instrumentation in accordance with the instrument manufacturers specifications and appropriate methods. The laboratories will maintain a stock of replacement parts to minimize downtime resulting from foreseeable breakage or typical consumption.

Section XIII. Instrument Calibration and Frequency

This section contains information and details pertaining to the calibration of both the sampling and the analytical systems. Analytical system discussions include those used in the laboratory as well as those utilized in the field.

1. Sampling Equipment. All sampling equipment to be used for this program will be calibrated prior to being mobilized to the site. The sampling contractor will supply spare equipment and spare parts to minimize failure of the sampling equipment. Calibration procedures will follow guidelines provided in the EPA document entitled "Quality Assurance Handbook for Air Pollution Measurement Systems; Volume III - Stationary Source Specific Methods" EPA-600/4-77-027b and MIL STD 45-662-A. All calibrations and checks will be performed prior to and at the conclusion of the trial burn as follows:

a. Probe Nozzles - using a micrometer, measure the inside diameter of the nozzle to the nearest 0.025 mm (0.001 in.). Make measurements at three separate places across the diameter and obtain the average of the measurements. The difference between the high and low values should not exceed 0.1 mm (0.004 in.). Post test check - inspect for damage.

b. Pitot Tubes - measure for appropriate spacing and dimensions or calibrate in a wind tunnel. The rejection criteria is provided on the calibration sheet. Post test check - inspect for damage.

c. Thermocouples - verify against a mercury-in-glass thermometer at three points including the anticipated measurement range. Acceptance limits are: impinger ± 2°F, dry gas meter ± 5.4°F, and duct ± 1.5% of the duct temperature.

d. Dry Gas Meters - calibrated in accordance with EPA Method 5. Acceptance criteria: pre-test volume correction factor (Yc) and delta H ±5%.

e. Balance - service and certify annually by the manufacturer. Prior to obtaining first weights confirm accuracy by placing a known S-type weight on the balance. Balances will be used for weighing the impingers and weighing the samples before sending them to the laboratory.

2. Laboratory Equipment

A summary of the calibration procedures and frequency for the laboratory instruments to be used for this project is provided in Table 13-1.

Table 13-1. Calibration Procedures for Analytical Methods

Method	Analytical Equipment	Calibration Curve	Calibration Checks	Target Criteria
6010B	ICP	Calibration Blank and one standard	Verified every 10 samples and at the end of the run sequence.	5 % RSD
7470A/7471 A	CVAAS	Calibration Blank and 5 standards	Verified every 10 samples and at the end of the run sequence.	Correlation coefficient of > 0.995
6020	ICP/MS	Calibration Blank and one standard	Verified every 10 samples and at the end of the run sequence.	Correlation coefficient of > 0.995
5041A	GC/MS	Five point calibration	Verified every 12 hour tune period	Variability of average RRF of 20% RSD for Method Compounds
8270C	GC/MS	Five point calibration	Verified every 12 hour tune period	Variability of average RRF of 30% RSD
8290	HRGC/HRMS	Five point calibration	Verified every 12 hour tune period	Variability of average RRF of 30% RSD
0040	GC	Three Point Calibration - in duplicate	Verified at end	Correlation coefficient of > 0.995
8081A	GC	Five point calibration	Verified every 12 hours	%RSD. 25%
8151A	GC	Five point calibration	Verified every 12 hours	%RSD. 25%
Method 5i	Analytical Balance	Class S Weights	Beginning and end of day	Self-taring
7199	IC	Four point calibration	Verified every 10 samples and at the end of the sequence	Correlation Coefficient > 0.995
9057	IC	Four point calibration	Verified every 10 samples and at the end of the sequence	Correlation Coefficient > 0.995

Section XIV. Inspection/Acceptance Requirements for Supplies and Consumables

The only consumables used in the sampling for the Performance Test will be sample bottles and the reagents used in the impingers and recovery of the samples. The sample containers will be purchased pre-cleaned with a certificate of analysis. Reagents used in the laboratory are of analytical reagent grade or higher purity; each lot of acid or solvent used is checked for acceptability prior to laboratory use. All reagents are labeled with the date received and the date opened.

Section XV. Data Acquisition Requirements

1. CAMDS will be responsible for collecting operations data, the Permit-required monitoring information, and system operating data in accordance with Standard Operating Procedures.

2. Process data to be collected includes chamber exhaust gas temperature, afterburner exhaust gas temperature, feed rate, furnace pressure, afterburner exhaust gas pressure drop, quench brine pressure, quench exhaust gas temperature, venturi pressure drop, venturi brine flow, clean liquor flow to scrubber, clean liquor pH, clean liquor pressure differential, quench brine pH, quench brine density, CO concentration, CO_2 concentration, O_2 concentration, and residence time.

Section XVI. Data Management

Specific QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in all projects.

1. Field Data Reduction.

a. Attachment A contains the standardized data sheets that will be used to record gas sampling data.

b. The data collected from each train will be reviewed in its entirety in the field by the Test Contractor.

c. Raw sampling data will be reduced on a daily basis. Isokinetic sampling rates and sample volumes will be reported each day. Errors or discrepancies will be noted in a field notebook.

d. The Stack Sampling Coordinator has the authority to institute corrective actions in the field. The Test Contractor will also be consulted for resolution if the situation warrants. At a minimum, the Field QC Coordinator is apprised of all deviations from the standard protocol.

2. Laboratory Analysis Data Reduction. Analytical results will be reduced to concentration units specified by the analytical procedure, using the equations given in the analytical procedures.

a. If the units are not specified, data from the analysis of liquid samples will be reported in units of mg/L. The results for liquid samples will be reported on an as received basis.

b. Solid samples will be reported in mg/kg. Solid samples will only result from collection in heated dry locations, so the results will be on a dry basis.

c. Gas samples will be reported on a concentration per dry standard cubic unit of measure.

d. Results of the analysis of audit cylinders will be reported in parts per billion.

3. Blank Corrected Data. Results from the metal emissions train will be blank corrected as instructed in Method 0060. A separate blank correction will be made for the front half and the back half of the Method 0060 sample train. The raw data will also be reported. The other data developed for each Trial Burn or Compliance Test will not be blank corrected.

Section XVII. Assessment and Response Actions

The Performance Test QA program will comply with EPA and state requirements for audits. These type of audits include performance and system audits as independent checks on the quality of data obtained from sampling, analysis, and data gathering activities. The procedures and techniques in place will ensure the audit will be representative of the measurement process in normal operation. Either type of audit may show the need for corrective action.

1. Performance Audits. A performance audit checks the performance or accuracy of measurements being made. The sampling and analysis segments of the project are checked in a performance audit. An audit cylinder or spiked audit samples may be supplied by the DSHW during a Trial Burn or Compliance Test. In the event an audit cylinder is supplied, it will be sampled and analyzed in the same manner as the field samples. If a spiked sample is supplied, it will be extracted and analyzed according to the same methods used for the field samples.

2. System Audits. A system audit involves observations by a subcontractor or a regulatory agency, who will try to ascertain that the work is being performed in accordance with the methods specified in this QAPP and Work Plan.

a. Field Audits.

(1) The Field QC Coordinator will observe all activities to ensure that the Work Plan and QAPP are being followed, that sample COC is accurate before samples are transported to the laboratory, report any discrepancies to the Test Contractor, complete a QA check list and maintain a log of discrepancies for the Test Contractor and QA Officer, and attend performance run meetings.

(2) A representative from the DSHW is expected to be on-site to observe all sampling activities. The point of contact for DSHW staff during the Performance Tests will be the designated CAMDS Representative.

(3) During each performance run, the Test Contractor performs a system audit, which consists of an inspection and review of the total sampling system. This consists of:

(a) Setting up a pre-test leak check of the sampling trains.

(b) Isokinetic sampling check (if required).

(c) Final leak check of the sampling train.

(d) Sample recovery.

(e) Sample analyses - if done on-site.

(4) Results of the leak checks are noted on the field data sheets while the remaining item checks are documented on the audit checklist. When necessary, audit samples are analyzed along with the test samples.

b. LAB Audit. At the direction of CAMDS, an audit of each laboratory may be conducted by the Test Contractor personnel who will ascertain that work is being performed in accordance with the methods specified in the QAPP and the Work Plan.

Section XVIII. Reports to Management

1. Internal Reports

a. The CAMDS Laboratory Services Coordinator prepares written reports on QC activities for the Quality Assurance Officer as needed. These reports detail the results of quality control procedures, problems encountered, and any corrective action, which may have been required.

b. All Corrective Action Forms are submitted to the QA Officer for initial approval of the corrective action planned and a copy is provided to the Test Director. All system audit reports are provided to the Test Director.

2. Reports to Client

a. The data transmitted will contain a summary of QA/QC activities. This summary will include:

(1) Instrument performance/system audits

(2) Adherence to protocol

(3) Sample custody

(4) Document control

(5) Data entry including error handling, correction, and additions

(6) Data traceability and completeness

(7) Data calculation and evaluation

(8) Quality problems found

(9) Corrective actions taken

(10) Data accuracy, precision, and completeness

b. The final report will include a section summarizing QA/QC activities during the program. The Test Director, Laboratory Analysis Coordinator, and the QA Officer will participate in preparing this section.

Section XIX. Data Review, Validation and Verification Requirements

1. Data Review

a. Field sampling data will be reviewed by the Test Contractor based on his or her judgment of the representativeness of the sample, maintenance and cleanliness of sampling equipment, and the adherence to an approved, written sample collection procedure.

b. All field data will be recorded on pre-formatted forms. The data sheets will be reviewed at the end of each run by the Test Contractor, and the CAMDS Stack Sampling Coordinator to ensure each sheet is properly completed.

(1) Gas sampling data will be reduced on-site to verify isokinetic sampling rates.

(2) The sampling contractor's isokinetic computer program will be checked for accuracy against a validated program.

c. Laboratory data will be reviewed by the analyst generating the data. Then the data will be reviewed by the supervisor. The Laboratory QC personnel will review the data per the laboratory procedure before the project report is prepared by the Laboratory Project Manager. When the analytical data is submitted to the sampling contractor, the data will again be reviewed before it is used to prepare the Sampling and Analysis Report.

2. Data Validation

a. Data validation is the process of accepting or rejecting data on the basis of established criteria. Analytical and sampling data will be validated by the Test Contractor's QC personnel using criteria outlined in this QAPP. The Test Contractor QC personnel will use validation methods and criteria appropriate to the type of data, even that judged to be an "outlying" or spurious value. The persons validating the data will have sufficient knowledge (i.e. at least one year experience in data validation) of the sampling and analytical methods to identify questionable values and deviations from criteria specified in the methods and the QAPP.

b. The results from the field and laboratory method blanks, replicate samples, and internal QC samples will be used to further validate analytical results. Analytical results on the field blanks and replicate samples also are valuable for validation of sample collection. The QA/QC personnel will review all laboratory and sampling raw data to verify calculated results presented, consistency, duplicate sample analysis, spike recoveries, tests for outliers, and transmittal errors.

c. The following criteria will be used to evaluate the field sampling data:

(1) Use of approved test procedures.

(2) Proper operation of the process being tested.

(3) Use of properly operating and calibrated equipment.

(4) Leak checks conducted before, during port change, and after tests.

(5) Use of reagents that have conformed to QC specified criteria.

(6) Proper traceability maintained.

d. The criteria listed below will be used to evaluate analytical data:

(1) Use of approved analytical procedures.

(2) Use of properly operating and calibrated instrumentation.

(3) Precision and accuracy achieved should be comparable to that achieved in previous analytical programs and consistent with the objectives stated in Section 20.0 in this QAPP.

3. Identification and Treatment of Outliers

a. Any point which deviates from others in its set of measurements will be investigated; however, the suspected outlier will be recorded and retained in the data while it is investigated. One or both of the following tests will be used to identify outliers:

(1) Dixon's test for extreme observations is an easily computed procedure for determining whether a single very large or very small value is consistent with the remaining data.

(2) The one-tailed t-test for difference may also be used in this case.

b. If more than one outlier is suspected in the same data set, other statistical sources will be consulted, and the most appropriate test of hypothesis will be used and documented.

c. Because an outlier may result from unique circumstances at the time of sample analysis or data collection, those persons involved in the analysis and data reduction will be consulted. This evaluation may provide an experimental basis for the outlier to determine its effect on the conclusions. In many cases, two data sets will be reported, one including and excluding the outlier.

4. Calculation OF DRE

a. The primary purpose of the MPF Performance Test is to determine the DRE of the surrogate POHC. If no POHC is detected above the Limit of Quantification (LOQ), then the LOQ will be used as the concentration of surrogate in the exhaust gas. The LOQ value will be used in the DRE calculation and the DRE will be reported as greater than (>) the value calculated. The LOQ is equivalent to the Practical Quantitation Limit (PQL). This calculation is given as an example for the DRE. The DRE is a percentage and will be calculated for agent constituents from the following formula:

$$DRE = \frac{W_{in} - W_{out}}{W_{in}} \times 100$$

where:

W_{in} = Mass Feed Rate of surrogate (Gross Feed Rate x Purity)
W_{out} = Mass Emission Rate of surrogate in Exhaust Gas

Section XX. Reconciliation with Data Quality Objectives

QA/QC objectives for the analyses of samples for this project are presented in Attachment B. Attachment B contains goals for sampling, objectives for accuracy, and objectives for precision.

1. Precision

a. Precision is defined as the degree of mutual agreement among individual measurements made under prescribed conditions. Precision goals have been included in Attachment B.

b. Precision will be calculated for laboratory duplicate analysis using the following equations:

$$RPD = [(X_1 - X_2) / ((X_1 + X_2) / 2)] \times 100$$

where:

RPD	=	Relative Percent Difference (standard deviation / average value) x 100
X_1	=	Highest Analytical result
X_2	=	Lowest Analytical Result

c. Calculation of the precision for each of the analyses of sample types will be based on different criteria and is taken from the EPA handbook: QA/QC Procedures for Hazardous Waste Incineration.

(1) The precision for the HCl samples will be determined by the RPD calculated from the analysis of a matrix spike and a matrix spike duplicate. A matrix spike and matrix spike duplicate will be used because the field samples have a history of very low concentrations.

(2) The precision of the SMVOC samples will be based on the RSD calculated from the analysis of the triplicate laboratory control sample. The precision of the semi-volatile compounds will be based on the RSD from the analysis of a triplicate analysis of a spiked sample. The results of the analysis of spiked sample will be used because of the historically low concentrations found in field samples.

(3) The precision for the metal emission samples will be based on a matrix spike and matrix spike duplicate. Low concentrations of metals in the field samples necessitates the use of matrix spike samples.

2. Accuracy

a. Accuracy is the degree of agreement of a measurement to an accepted reference or true value. The accuracy of the trial burn data will be determined from analysis of samples spiked with a known concentration. The number of spiked samples and the spiking levels will be taken from the respective methods. Accuracy objectives have been set and are presented in Attachment B.

b. The formula which will be used to assess the accuracy of the QA/QC laboratory (e.g. matrix and spike analysis) data is as follows:

$$\%R = \frac{(Q_{ss} - Q_{us})}{Q_s} \times 100$$

where:

%R	=	Percent recovery
Q_{ss}	=	Quantity of Analyte Found in the Spike Sample
Q_{us}	=	Quantity of Analyte Found in the Un-spiked Sample
Q_s	=	Quantity of Added Spike

c. Calculation of the accuracy for each of the analyses of sample types will be based on different criteria and is taken from the EPA handbook: QA/QC Procedures for Hazardous Waste Incineration.

(1) The accuracy for the HCl samples will be determined by the %R calculated from the analysis of a matrix spike and a matrix spike duplicate.

(2) The accuracy of the SMVOC samples will be based on the %R calculated from the analysis of the triplicate laboratory control sample, %R of surrogate spikes, and %R of laboratory control samples. The accuracy of the semi-volatile compounds will be based on the %R from the analysis of a blank spiked sample %R of surrogate spikes, and %R of laboratory control samples.

(3) The accuracy for the metal emission samples will be based on the analysis of a matrix spike and matrix spike duplicate.

3. Completeness

a. Completeness is defined as the amount of valid data from a measurement system compared to the amount that was expected to be obtained under optimal normal conditions. The completeness goal is to have 100 percent of the data valid, in that at least six valid performance runs are needed for each Trial Burn/Compliance Test. Acceptable results must be obtained for all six performance runs. The completeness objective for the entire monitoring project is to obtain a certain amount of data needed to complete the statistical design (EPA QA/QC Handbook, 1990).

b. Completeness will be reported as the percentage of all measurements judged to be valid. Every attempt will be made to ensure that all data generated will be valid data. If data appears questionable based on circumstances that occurred or were

observed during the field sampling additional runs will be completed as soon as the system can be reset to ensure that three performance runs are completed. In reality, some samples may be lost in laboratory accidents, and some results may be deemed questionable based on laboratory QC procedures. The completeness objective may be met at less than 100 percent completeness depending on the number of samples and the critical nature of the missing data, but usually this requires more than 90 percent completeness.

c. The following formula will be used to determine completeness:

$$C = \frac{V}{T} \times 100\%$$

where:

C = Percent Completeness
V = Number of Measurements Judged Valid
T = Total Number of Planned Measurements

4. Representativeness and Comparability

a. Representativeness is defined as "the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, process condition, or an environmental condition."

b. Comparability is defined as "expressing the confidence with which one data set can be compared to another" (Interim Guidelines and Specifications for Preparing QAPPs).

c. It is recognized that the usefulness of the data is also contingent upon meeting the criteria for representativeness and comparability. Wherever possible, reference methods and standard sampling procedures will be used.

(1) The representativeness QA objective is that all measurements be representative of the media and operation being evaluated.

(2) The detailed requirements for HF, HCl, Cl_2, HRA metals (Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, Se, Ag, Tl, Sn, V and Zn), phosphorus, O_2, CO, CO_2, moisture, particulates, VOCs, SVOCs, TOCs, and PCDDs/PCDFs given in their respective methods will be followed to ensure representative sampling.

d. The comparability QA objective is that all data resulting from sampling and analysis be comparable with other representative measurements made by the sampling contractor, or another organization on this or similar processes operating under similar conditions. The use of published sampling and analytical methods and standard reporting units will aid in ensuring the comparability of the data.

5. Detection Limits

a. The PQLs for parameters to be analyzed for the Performance Tests are included in Attachment B. The PQLs were derived from the laboratory's standard operating procedures and the analytical methods referenced in this document. These limits will be compared to the actual analytical results in the final report.

Appendix J
Attachment A

Examples of Chain of Custody Forms, Stack Sampling Record Sheets, and Sample Labels

Table of Contents

Title

CHAIN OF CUSTODY RECORD

Project Name _____
Project No.: _____
Sampling Date(s): _____
Laboratory: _____
Laboratory P.O. #: _____
Shipping Airbill No.: _____
Shipping Date(s): _____
Shipper's Name: _____

Sample Code	Sampled Date	Container Size	Container G/P	MATRIX: Aqueous	Organic Solvent	Ash/Soil/Sediment	Acidic	Basic	Other	Source Description	ANALYSIS: Trace Metals*	Mercury	Hexavalent Chromium	HCl	Cl2	Particulate Matter	PCDD/PCDF	Semi-Volatile Organics	Volatile Organics	Physical Parameters*			Comments

Relinquished by:	Date/Time:	Relinquished by:	Date/Time:
Received by:	Date/Time:	Received by:	Date/Time:

REMARKS (*):

WHITE - LABORATORY YELLOW - LABORATORY COPY . PINK - OFFICE COPY GOLD - FIELD COPY

STACK GEOMETRY AND GAS VELOCITY DATA

Date:	Project No.'.
'ient:	Sample Location:
Facility:	Load Condition:
Run No.:	Operator:
Barometric Pressure (in. Hg):	Meterbox No.:
% Moisture:	Static (in. H_20):
Pitot Tube ID:	Pitot Tube Coefficient:
Post Leak Check:	Stack Diameter (in.):
Measurement Device: Micromanometer: 10" Manometer. Magnehelic: Other: Explain:	Schematic of Stack Cross Section: Stack Diameters Upstream: Stack Diameters Downstream

Time (24 hr. clock)	Sample Point	Stack Temp °F or °C	Manom. Reading in H_2O	Cyclonic Flow Null Angle

Time (24 hr. clock)	Sample Point	Stack Temp °F or °C	Manom. Reading in H_2O	Cyclonic Flow Null Angle

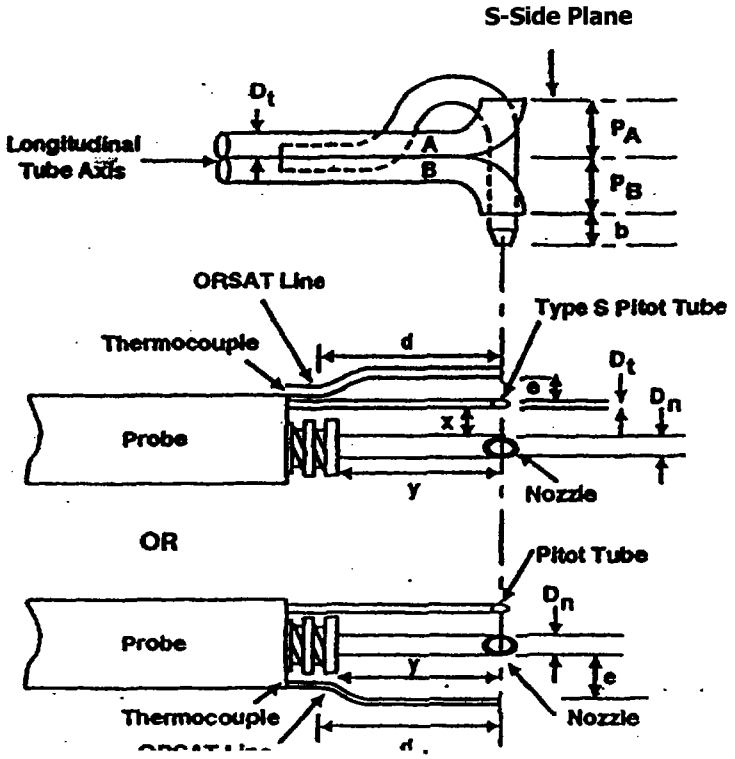
1

Pitot Tube ID No.

Tubing Diameter, Dt

Pilot Tube Assembly Level? Yes/No

Pilot Tube Opening Damaged? Yes/No



Note:
1.05 $D_t \leq P \leq 1.50\ D_t$

P_A = _____ in.

P_B = _____ in.

$P_A = P_B$ Yes/No _____

A' = _____ in.

b = _____ in.

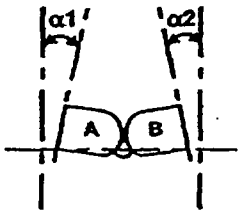
D_t _____ e _____

y _____ x _____

d _____ D_n _____

y _____

f _____

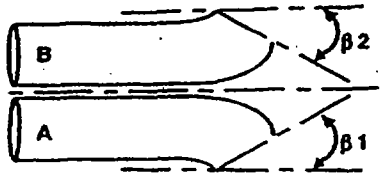


α 1 = _____°

α 2 = _____°

$-10 \leq \alpha_1 \leq 10°$

$-10 \leq \alpha_2 \leq 10°$

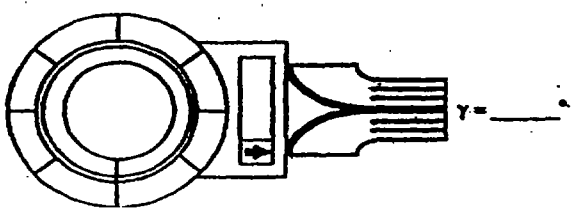


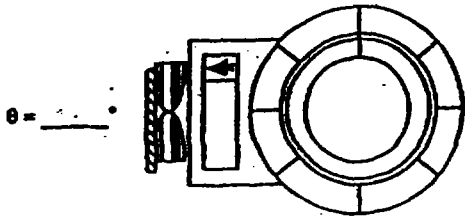
β 1 = _____°

β 2 = _____°

$-5 \leq \beta_1 \leq 5°$

$-5 \leq \beta_2 \leq 5°$





Level Position to find Y = _____ Level Position to find 0 = _____

Z = A' sin y_____ in. (< 1/8 in.) W = A' sin 0_____in. (< 1/32 in.)

Comments:_____

Checked by:_____ Date:_____

QA/QC by:_____ Date: _____

Calibration Required?_____. Yes No

Dt = External Pitot Tube Diameter

A = Distance Between Tips (PA+ PS) inches

Specifications (EPA Method 2)

Dt = 3/16" to 3/8"	x ≥ 3/4"	y ≥3"	e ≥ 3/4"	1.05 Dt ≤ P ≤ 1.50 Dt
D_n=1/2"	b>o	d>3"	Pa =Pb	

1

Isokinetic Flue Gas Sampling Data Sheet

Project No.: _____
Client: _____
Facility: _____
Source: _____
Sample Location: _____
Stack Diameter: _____
Date: _____
Run No.: _____
Operator: _____
Meterbox No.: _____
Meterbox ΔH @: _____
Y Factor: _____

VERY IMPORTANT - FILL IN ALL BLANKS
Read and Record at the Start of Each Test Point
SKETCH

Sheet _____ of _____

Train Prepared By: _____
Pitot Number and Side: _____
Pitot Tube CP: _____
Filter No.: _____
Ambient Temp., °F: _____
Bar. Pressure, In. Hg.: _____
Assumed Moisture, %: _____
Heater Box Setting, °F: _____
Nozzle # / Dia., In.: _____
Probe Length / Material: _____
Probe Heater Setting: _____

	Clock Time				IInche[c]S H		Temper t[tu]ure,				Temperatures °F °C					
Point	24-hr	min	Gas Meter, Dry (ft')	Pitot In. p.P2 O	Desired	Actual	Inlet	Outlet	Vacuum I~n . Gauge H	Silica Gel Cond.	Stack	Filter Box	imp Tp	XAD Cond	Probe	Filter Outlet

Train Leak Check:

Before Test: CF in Seconds at In. Hg

After Test: CF in Seconds at In. Hg

Comments:

Static Pressure

Initial Final

Port

Pitot Tube Leak Check

1

VOST DATA SHEET

Project No.: _____ **Date** _____

Client _____ **Flow Rate (Lpm)** _____

Facility _____ **DGM Y at Lpm** _____

Source _____ **Barometric Pressure** _____

Sample Location _____ **Operator** _____

DGM No.: _____ **Sample Point Location**

Run No. _____ **Port** _____ **Point** _____

Train Leak Check- Initial: VAC InMg, A InMg, sec
Train Leak Check - Final: VAC inMg, A InMg, 'sec

Clods Time (24 hr)	Sampling Time (min)	Rotameter Reading . Umin.	Gas Sample Volume liters	1st cond. Outlet temp. °C	Gas Sample Temp At Dry Inlet .C	Gas Outlet Meter	Probe Temp. 'F	. pump Vacuum in. Gau^{Hg}

Sample Trap I.D. COMMEN^{T}S:
Field Blank -
TENAX:
TENAXtCHARCOAL:
Sample
TENAX:
TENAX/CHARCOAL:

NOZZLE CALIBRATION

Nozzle No.	Diameter (in.)				Nozzle
	a	b	c	Average	Set No.

Traverse Point Location for Circular and Rectangular Ducts

Project No.: _____

Client: _____

Date: _____

Sampling Location: _____

Internal Stack Diameter: _____

Nipple Length: _____

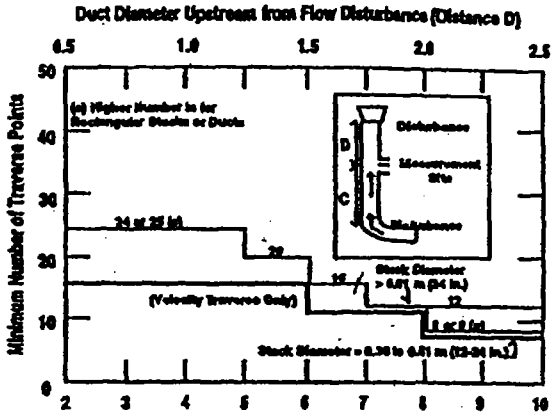
Total Stack Diameter: _____

Nearest Upstream Disturbance (C): _____

Nearest Downstream Disturbance (D): _____

Calculator: _____

Traverse Point	1 Fraction of Stack ID 1	2 Stack	3 Traverse Point 1 2=PO"	4 P? Length	5 Traverse Point inside of Far Wag to Outside of Port Nipple (3 + 4 = Point)
1					
2					
3					
4					
5					
6					
T					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					



Rectangular Duct Equivalent Diameter Determination = $\frac{2xLxW}{L+W}$

Lo	4	6	8	10	12	14	16	18	20	22	24
1	5.7	4.4	3.2	2.6	2.1	1.3	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.8	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.8	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.8	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

Location of Traverse Points In Rectangular

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	85.4	79.2
11										95.5	87.5
12											95.8

SAMPLING TRAIN SETUP AND RECOVERY SHEET

Setup Recovery

Project No.: _____ Date: _____

Client: _____ Run No.: _____

Facility: _____ Train Type: _____

Source: _____ Recovery Person: _____

FRONT HALF

Filter No.:				Comments:
Thimble No.:				

XAD Trap No.:				Comments:
XAD Final Wt. (g):				
XAD Initial Wt.(g):				
Net Collected (g):				

IMPINGERS

Impinger No.:				
Reagent:				
Final Volume (ml / g):				
Initial Volume (ml / g):				
Net Collected (ml / g):				

Impinger No.:				
Reagent:				
Final Volume (ml / g):				
Initial Volume (ml / g):				
Net Collected (ml / g):				

Silica Gel Impinger:				
Final Volume (ml / g):				
Initial Volume (ml / g):				
Net Collected (ml / g):				

TOTAL MOISTURE (Impingers and Silica Gel) (g) = _____

Project No.: ____________________ Date: ____________________

Client: ____________________ Source: ____________________

Plant: ____________________ Sample Location: ____________________

Calculated by: ____________________ Checked by: ____________________

TM & TS in °R

$$K = \frac{\Delta H}{\Delta P} = 846.72\ (DN)^4\ \Delta H_@\ CP^2\ (Md)^2\ \left(\frac{MWD}{MWS}\right)\left(\frac{TM}{TS}\right)\left(\frac{PS}{PM}\right);\ \Delta H = K\Delta P$$

T_s = [ ] °F + 460 = ______ °R

$K = \frac{\Delta H}{\Delta P} = 846.72\ (\quad)^4\ (\quad)\ (\quad)^2\ (\quad)^2\ \left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}$

K = [ ] $\Delta\bar{P}$ = ______, $\Delta\bar{H}$ = ______, ΔP_{MAX} = ______, ΔH_{MAX} = ______,

---

T_s = [ ] °F + 460 = ______ °R

$K = \frac{\Delta H}{\Delta P} = 846.72\ (\quad)^4\ (\quad)\ (\quad)^2\ (\quad)^2\ \left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}$

K = [ ] $\Delta\bar{P}$ = ______, $\Delta\bar{H}$ = ______, ΔP_{MAX} = ______, ΔH_{MAX} = ______,

---

T_s = [ ] °F + 460 = ______ °R

$K = \frac{\Delta H}{\Delta P} = 846.72\ (\quad)^4\ (\quad)\ (\quad)^2\ (\quad)^2\ \left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}$

K = [ ] $\Delta\bar{P}$ = ______, $\Delta\bar{H}$ = ______, ΔP_{MAX} = ______, ΔH_{MAX} = ______,

---

T_s = [ ] °F + 460 = ______ °R

$K = \frac{\Delta H}{\Delta P} = 846.72\ (\quad)^4\ (\quad)\ (\quad)^2\ (\quad)^2\ \left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}$

K = [ ] $\Delta\bar{P}$ = ______, $\Delta\bar{H}$ = ______, ΔP_{MAX} = ______, ΔH_{MAX} = ______,

---

T_s = [ ] °F + 460 = ______ °R

$K = \frac{\Delta H}{\Delta P} = 846.72\ (\quad)^4\ (\quad)\ (\quad)^2\ (\quad)^2\ \left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}\left\{\frac{\quad}{\quad}\right\}$

K = [ ] $\Delta\bar{P}$ = ______, $\Delta\bar{H}$ = ______, ΔP_{MAX} = ______, ΔH_{MAX} = ______,

---

AF-248A

Calculation for Desired Nozzle

Project No.: _____ **Date:** _____

Client: _____ **Source:** _____

Plant: _____ **Sample Location:** _____

Calculated by: _____ **Checked by:** _____

T_S = _____ °F + 460 = [ ] °R $\quad \Delta P_{AV}$ = [ ]

T_M = _____ °F + 460 = [ ] °R $\quad C_p$ = [ ]

MWD = [ ] # / # - mole

MWS = [ ] # / # - mole

MD = [ ]

PB (PM) = [ ]

PST = $\frac{\quad}{13.6}$ = [ ]

PS (PB ± PST) = [ ]

Sampling Rate, dscfm, Q_m

(1) @ $\Delta H@ = 0.75$ (normal)

(2) At any other ΔH:

$$\left(\frac{\Delta H}{\Delta H_@}\right)^{1/2} \times 0.75 = \left(\frac{\quad}{\quad}\right)^{1/2} 0.75 = \frac{\quad}{\text{dscfm}}$$

$$D_{N\ (desired)} = \left[\left(\frac{(TS)\ (MWS)}{(PS)\ (\Delta P_{AV})}\right)^{1/2} \left(\frac{0.0357\ (Q_M)\ (PM)}{(TM)\ (C_p)\ (MD)}\right)\right]^{1/2}$$

$$= \left[\left(\frac{(\quad)\ (\quad)}{(\quad)\ (\quad)}\right)^{1/2} \left(\frac{0.0357\ (\quad)\ (\quad)}{(\quad)\ (\quad)\ (\quad)}\right)\right]^{1/2}$$

D_N = [ ] inches $\quad D_N$ Actual = [ ] inches

AF-240

Field Moisture Determination

Client: _____ Project No.: _____

Location: _____ Date: _____

Run No.: _____ Operator: _____

Data

Impingers

	1	2	3
Final mL			
Initial mL			
Net mL			

Total Moisture (Net mL + Net gm) = _____

Silica Gel

Container No. _____

Final gm _____

Intial gm _____

Net gm _____

Calculations

(1) PB = _____ Meterbox No.: _____

(2) VM Net = _____ Y = DGM Calibration Factor = _____

(3) TM Avg = _____ TM + 460 = _____

(4) PM Avg = + − _____ Orifice in. H_2O × $\frac{1}{13.6}$ = + _____ orifice in.Hg.

= − _____ Vacuum gage In. Hg (when meter is before pump)

(5) $VMSTD = \frac{528 \times VM \times (PB + PM) \times (Y)}{29.92 \times (TM + 460)}$ = _____

(6) VW = mL H_2O + gm Silica Gel = _____

(7) VW Gas = VW × 0.04715 = _____

(8) $\%M = \frac{100 \times VW\ Gas}{VMSTD + VW\ Gas} = \frac{100 \times (\quad)}{(\quad) + (\quad)} = \frac{(\quad)}{(\quad)} =$

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Sample Train Tracking Form

Sample Train: _____ Date: _____

Location: _____ Run: _____

Sample ID: _____

XAD Lab ID No.: _____ Verified By: Lab Chemist: _____

Trap Description: _____ Train Operator: _____

_____ Stack QA: _____

Train Set Up By: _____ Date: _____ Time: _____

Transported to Location By: _____ Date: _____ Time: _____

Received at Location By: _____ Date: _____ Time: _____

Transported to Recovery Area By: _____ Date: _____ Time: _____

Received at Recovery Area By: _____ Date: _____ Time: _____

Train Recovered By: _____ Date: _____ Time: _____

Comments: _____

Method 0023A - PCDD/PCDF

Appendix J
Attachment B

QA/QC Objectives for Analytical Methods

Appendix J, Attachment B.

QA/QC Objectives and Target Analyte Lists

List of Tables

Table 1 - Summary QA/QC Criteria for Volatile Total Organic Compounds C_1 to C_8 Tedlar Bag Analysis

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Field Blanks	1 per trial burn	< 5% x PQL[(1)]	Clean System. Recollect Sample. Reanalyze
Trip Blank	1 per run	< 5% x PQL	Determine contamination source, reanalyze.
Laboratory Blank*	2 per trial burn, analyzed as required	< 5% x PQL	Determine contamination source, reanalyze.
Initial Calibration	3 levels in duplicate	r > 0.995**	Recalibrate.
Continuing Calibration	RRT and RRF	± 10%	Reanalyze. Recalibrate and reanalyze affected samples.
Laboratory Control Sample (LCS), Accuracy	1 per day	80 - 120%	Check system, reanalyze. Recalibrate.
LCS, Precision	1 per day	± 20% RPD	Check system and reanalyze.
Field Control Sample (FCS), Accuracy	1 per trial burn	50 - 150%	Check system and reanalyze.
FCS, Precision	1 per trial burn	± 50%	Check system and reanalyze.
Field Spike, Accuracy	1 per trial burn	80 - 120%	Check system and reanalyze.
Field Spike, Precision	1 per trial burn	± 20% RPD	Check system and reanalyze.
PQL	Each Range	0.25 ppmv	
Holding Times	Tedlar Bag	2 hours	

C_5 to C_8 Purge & Trap Analysis

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Method Blank	1 per analytical batch	< PQL	Reanalyze. Assess impact on data. Narrate.
Initial Calibration	C_5 to C_8 , 3 point injected in duplicate	RSD < 20%	Recalibrate.
Continuing Calibration	RRT RRF	15% ≤ 3 sd	Recalibrate and reanalyze affected samples.
Precision/Accuracy	LCS Duplicate	40 - 120% RPD 50%	Reanalyze. Assess impact on data. Narrate.
Holding Times		14 days	

(1) Practical Quantitation Limits (PQLs) for Gravimetric Methods are listed as Reporting Limits (RLs) in Table 41 of this Attachment.

* Laboratory blank is analyzed only if the field and trip blanks fail criteria.

** This criteria is a goal only since no criteria is specified in the method.

sd standard deviation

NOTE: The compounds will be summed up to and including Octane. All compounds with retention times < C_5 will be reported and quantitated as C_5.

Table 2 - Summary QA/QC Criteria for Total Organics - Semivolatile Organics

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Field Blanks	1 per trial burn	< 5% of lowest sample	Reanalyze. Narrate.
Lab Blanks	1 per analytical batch	< Reporting limit	Reanalyze. Assess impact on data. Narrate.
Initial Calibration	C10, C12, and C14	RSD of RRF ≤ 20%	Recalibrate.
Continuing Calibration	RRT and RRF	± 15%	Recalibrate and reanalyze affected samples.
Precision and Accuracy	LCS	40 - 120%	Reanalyze. Assess impact on data. Narrate.
	Duplicates	± 50% RPD	Reanalyze. Assess impact on data. Narrate.
Verification	LCS	Different Source/Lot	Check system and reanalyze.
Holding Time		14 Days	

(1) Reporting Limits for Method 8270C Methods are listed in Tables 33 and 34 of this Attachment.

Table 3 - Summary QA/QC Criteria for Total Organics - Nonvolatile Organics

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Field Blanks	1 per run	< 5% of lowest sample	Reanalyze. Narrate.
Lab Blanks	1 per analytical batch	< Reporting limit	Reanalyze. Assess impact on data. Narrate
Initial Calibration	Balance Calibration - Certified Stds	± 2%	Check system and reanalyze.
Precision and Accuracy	LCS	85% to 115%	Reanalyze. Assess impact on data. Narrate
	Duplicates	± 20% RPD	Reanalyze. Assess impact on data. Narrate
Verification	Balance	Class S Weights	Check system and reanalyze.
Holding Time		14 Days	

(1) Reporting Limits for Grav Method are listed in Table 41 of this Attachment.

Table 4 - Summary QA/QC Criteria for Volatile Organic Compounds SMVOC (0031 and 5041A)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Demonstrated Ability	Surrogates	50% - 150%	Correct problem, Narrate.
Field Blanks	1 per five pairs	< Lowest Standard	Report and narrate.
Trip Blanks	1 per shipment	< Lowest Standard	Report and narrate.
Lab Blanks	1 per analytical batch	< Lowest Standard	Correct problem, reanalyze.
Initial Calibration	Five Levels, as per target list	RRF 30%	Correct problem, reanalyze.
	SPCC RRF	>0.1 Chloromethane 1,1-Dichloroethane Bromoform >0.3 Chlorobenzene 1,1,2,2-Tetrachloroethane	Correct problem, reanalyze.
	CCC plus selected POHCs	<15% RSD for POHCs <30% RSD for other CCC compounds	Correct problem, reanalyze.
Continuing Calibration	Midpoint Standard - Every 12 Hours	N/A	
	SPCC RRF	Same as Initial	Correct problem, reanalyze.
	CCC plus selected POHCs	± 20% Diff	Correct problem, reanalyze.
Consistency in Chromatography	Internal Standard RRT	± 30 Seconds	Correct problem, Narrate.
	Internal Standards	-50% to 150%	Correct problem, Narrate.
Precision and Accuracy	2 Fortified Blanks per batch	75% - 125% REC ± 25% RPD	Correct problem, reanalyze.
Continuing Accuracy Check	Surrogates	50% - 150%	Correct problem, Narrate.
Detection Limit	For Each Compound	Based on Lowest Standard	
VOST Audit Sample	Once per TB	50% - 150%	Report, assess impact on data.
VOST Condensate	MS/MSD	50 - 150% Rec. <35% RSD	Report, assess impact on data.
Breakthrough Determination	Separate analysis of pairs	<30% on T/C	
Holding Time		14 Days	

(1) Reporting Limits for Total Chromatographable Organics (TCO) are listed in Table 40 of this Attachment.

Table 5 - Summary QA/QC Criteria for Semivolatile Organics SVOST (0010 and 8270C)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Method Blank	1 per analytical batch	< PQL (1) (2)	Reanalyze. Assess impact on data. Narrate.
Field Blank	1 per trial burn	< PQL	Reanalyze and/or narrate.
Trip Blank	1 per trial burn	< PQL	Reanalyze and/or narrate.
Instrument Tune	Every 12 hours, initially and as required.	As per 8270C	Retune instrument. Repeat DFTPP analysis.
Initial Calibration Five point	SPCC RRF	> 0.050	Evaluate system.
	CCC	RSD ≤ 30%	Recalibrate.
	Other Compounds <15% RSD	Average RF	
	Other Compounds <15% RSD	Linear Curve	
Continuing Calibration	SPCC RRF	Same as Initial	Evaluate system. Repeat calibration check.
	CCC	RSD ≤ 20%	Recalibrate. Reanalyze affected samples.
Internal Standards	RRT	± 30 seconds	Check sensitivity of system.
	Accuracy	50 - 200%	
Precision and Accuracy	LCS per batch	Historical lab data, see Tables	Check calculations. Reanalyze. Assess impact on data. Narrate.
	Duplicate LCS	Historical lab data, see Tables	Check calculations. Reanalyze. Assess impact on data. Narrate.
	Surrogates	Historical lab data, see Tables	Check calculations. Reanalyze. Assess impact on data. Narrate.
PQL	Standard Compounds	10 µg/fraction	
Audit Sample	As Supplied	As Supplied	
Holding Time		7 Day Extraction 40 Day Analysis	

(1) The term PQL refers to the laboratory's standard Reporting Limit (RL). These are provided for Method 8270 in Tables 33 and 34 of this Attachment.

(2) Except for common lab contaminants: Phthalate esters may be reported with qualifiers if the concentration of the analyte is less than five times the PQL. Such action must be addressed in the case narrative.

Table 5A - Summary QA/QC Criteria for Semivolatile Organics SVOST (0010 and 8270C)

HISTORICAL CONTROL LIMITS

	COMPOUND	ACCURACY	PRECISION
DCS/LCS			
	Phenol	47-108	18
	2-Chlorophenol	47-113	20
	1,4-Dichlorobenzene	42-114	22
	N-nitrosodi-n-propylamine	46-107	15
	1,2,4-Trichlorobenzene	45-118	16
	4-Chloro-3-methylphenol	55-118	13
	Acenaphthene	54-119	10
	4-Nitrophenol	43-166	17
	2,4-Dinitrotoluene	59-113	10
	Pentachlorophenol	59-128	10
	Pyrene	45-140	11
Surrogates			
	Nitrobenzene-d5	45-107	N/A
	2-Fluorobiphenyl	62-110	N/A
	Terphenyl-d14	58-135	N/A
	Phenol-d5	43-130	N/A
	2-Fluorophenol	36-111	N/A
	2,4,6-Tribromophenol	58-131	N/A

DCS Duplicate Control Samples

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 6 - Summary QA/QC Criteria for Metals (6010B)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Demonstrated Ability	LCS	80% - 120%	Check calculations. Reextract and reanalyze as necessary. Assess data and narrate.
Field Blanks	1 per TB	< Reporting limit(1)	
Lab Blanks	Calibration Blank Method Blank	< Reporting limit	Reanalyze. Reextract and reanalyze as necessary, including affected samples.
Initial Calibration	Calibration Blank + one Standard	Linear CC of ≥ 0.995	Evaluate system and recalibrate.
	ICV	90% - 110%	Reanalyze ICV. Recalibrate.
Continuing Calibration	Midpoint Standard - Every 10 samples	90 - 110%	Reanalyze CCV. Recalibrate. Reanalyze affected samples.
Precision and Accuracy	1 LCS per batch	80% - 120%	Check calculations. Reextract and reanalyze as necessary. Assess data and narrate.
	MS/MSD per Batch	75% - 125% Rec	Check calculations. Assess impact on data and narrate.
	Post Digestion Spike	75% - 125% Rec	
Continuing Accuracy Check	Interference Check-Before and After	80% - 120% Rec	Reanalyze. Recalibrate. Reanalyze affected samples.
	Continuing Calibration Verification CCV	90% - 110%	Reanalyze CCV. Recalibrate. Reanalyze affected samples.
Verification	ICV	Different Source/Lot	
Spiked Filter	One per TB	75% - 125% REC	Check calculations. Assess impact on data and narrate.
Detection Limit		SW-846 Chap 1	
Holding Time		180 Days	

(1) Reporting Limits for Method 7470A are listed in Tables 30 and 32 of this Attachment.

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 7 - Summary QA/QC Criteria for Mercury (7470A)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Demonstrated Ability	LCS	80% - 120%	Check calculations. Reextract and reanalyze as necessary. Assess data and narrate.
Field Blanks	1 per TB	< Reporting limit(1)	
Lab Blanks	Calibration Blank Method Blank	<Reporting limit	Reanalyze. Reextract and reanalyze as necessary, including affected samples.
Initial Calibration	Calibration Blank + Five Standards	r > 0.995	Evaluate system and recalibrate.
Continuing Calibration	Midpoint Standard - Every 10 samples	± 20%	Reanalyze. Recalibrate. Reanalyze affected samples.
Precision and Accuracy	1 LCS per batch	80% - 120%	Check calculations. Reextract and reanalyze as necessary. Assess data and narrate.
	MS/MSD per Batch	70% - 130% Rec ± 25% RPD	Check calculations. Assess impact on data and narrate.
Continuing Accuracy Check	Instrument Calibration Verification ICV	80% - 120%	Reanalyze ICV. Recalibrate.
Verification	ICV	Different Source/Lot	
Detection Limit		0.0002 mg/L	
Holding Time		28 Days	

(1) Reporting Limits (RLs) for Method 7470A are listed as in Tables 30 and 32 of this Attachment.

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will as applicable.

Table 8 - Summary of Quality Control and Calibration Criterion SW 846 Method 6020 (Metals by ICP/MS)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Instrument Tune	Daily, prior to calibration and sample analysis	Mass resolution < 1.0 amu @ 10% peak height and mass calibration ± 0.1 amu from expected value.	Retune instrument. Repeat tune solution and analysis.
Initial Calibration	Laboratory mixed standard calibration	r ≥ 0.995	Evaluate and reanalyze ICV. Recalibrate
Calibration Blank	After initial calibration and each continuing calibration	< Reporting limit(1)	Clean system. Rerun. Reanalyze affected samples.
Initial Calibration Verification (ICV)	After calibration	90% - 110%	Evaluate and reanalyze ICV. Recalibrate
Continuing Calibration Verification (CCV)	Every ten samples end of run	90% - 110%	Reanalyze CCV. Recalibrate. Reanalyze samples.
Continuing Calibration Blank (CCB)	With continuing calibration	< Reporting limit	Reanalyze CCB. Recalibrate. Reanalyze samples
Internal Standards	accuracy/ all blanks and standards. accuracy / all samples.	≤ 20% of initial calibration 30% - 120%	Reanalyze and/or narrate.
Method Blank	Each batch	< Reporting limit	Reanalyze. Re-prepare samples.
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	Each matrix	75% to 125% 25% RPD	Check calculations. Reanalyze. Assess impact on data.
Duplicate Injection	1 per analytical batch	25% RPD	Check calculations. Reanalyze. Assess impact on data.
Laboratory Control Samples (LCS)	Each batch	75% - 125% 25% RPD	Check calculations. Reanalyze. Assess impact on data.
Holding time		180 Days	

(1) Reporting limits, or PQLs, for Method 6020 are provided in Tables 27 and 31 for Method 6020.
For air matrices, the QC samples per batch include a LCS only (no MS/MSD).
The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 9 - Summary QA/QC Criteria for Dioxin (0023A)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Demonstrated Ability	Laboratory Control Sample LCS	1 per batch	Review internal standards. Assess impact on data. Process archive sample if necessary.
Field Blanks	1 per TB	<5 times PQL[(1)]	Reanalyze and/or narrate.
Reagent Blanks	1 per analytical batch Method Blank	<5 times PQL	Reanalyze and/or narrate.
Initial Calibration	Five Levels		Evaluate system. Recalibrate.
	Targets	≤ 25% RSD	
Continuing Calibration	Midpoint Standard - Every 12 Hours	± 25% RSD	Evaluate system. Reanalyze CCAL. Recalibrate as necessary. Reanalyze samples.
Consistency in Chromatography	Window/Valley Mix	25% Valley	Readjust windows. Evaluate system. Perform maintenance. Reanalyze WDM/CPSM.
	Internal Standard	RRT of ± 3 seconds 40% - 130%	Check chromatogram for interference. Check instrument and reanalyze if necessary. Check signal-to-noise, if < 10:1 process archive sample. Assess impact on data and narrate.
Surrogate Precision and Accuracy	LCS per batch	70% - 130%	Check calculations. Review internal standards. Assess impact on data. Process archive sample if necessary.
Audit Samples	One per TB	70 - 130%	
Detection Limit	For each isomer	See 0023A	
Holding Time		30 Days Extraction 45 Day Analysis	

(1) Practical Quantitation Limits (PQLs) for Method 0023A are listed as Reporting Limits (RLs) in Table 38 of this Attachment.

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 10 - Summary QA/QC Criteria for Chloride (9057)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Demonstrated Ability	LCS	80% - 120%	Recalibrate.
Field Blanks	1 per TB	< Reporting limit(1)	Narrate
Lab Blanks	Method Blank	< Reporting limit	Reanalyze. Assess impact on data. Narrate.
Initial Calibration	Four Levels	r > 0.995	Evaluate system. Recalibrate.
	RRT Window	± 3SD	
Continuing Calibration	Midpoint Standard every 10 samples	90% - 110%	Evaluate system. Repeat calibration check. Recalibrate. Reanalyze affected samples.
	RRT	Within ± 3SD	
Precision and Accuracy	LCS per batch	80% - 120% Rec	Check calculations. Reanalyze. Assess impact on data. Narrate.
	MS per Batch (front and back)	90% - 110%	Check calculations. If RPD is in control, accept data and narrate. IF RPD is out of control, reanalyze.
	Duplicate per batch (front and back)	± 25% RPD	Reanalyze. Assess impact on data. Narrate.
Continuing Accuracy Check	Instrument Calibration Verification (CCV)	90% to 110%	Evaluate system. Repeat calibration check. Recalibrate. Reanalyze affected samples.
Verification	ICV	Different Source/Lot	Evaluate system. Recalibrate.
Holding Time		28 Days	

(1) Reporting Limits for Method 9057A are listed in Tables 35, 36, and 37 of this Attachment.

Table 11 - Summary Quality Control and Calibration Criterion SW 846 Method 8260B GC/MS for Volatile Organics

Quality Parameter	Method/ Frequency	Criteria	Corrective Action
Method Blank	1 per analytical batch	< PQL[1] [2]	Reanalyze. Assess impact on data. Narrate.
Instrument Tune	Every 12 hours	Refer to method.	Retune instrument. Repeat BFB analysis.
Initial Calibration, Five point	SPCC RRF	0.10 Chloromethane 0.10 1,1 DCA > 0.10 Bromoform 0.30 Chlorobenzene 0.30 1,1,2,2 TCA	Evaluate system. Recalibrate.
	CCC	RSD ≤ 30%	
	Other compounds: <15% RSD	Average RF	
	Other compounds: >15% RSD	Linear Curve	
Continuing Calibration	SPCC RRF	Same as initial	Evaluate system. Repeat calibration check. Reanalyze affected samples.
	CCC	< 20% drift	
Internal Standards	RRT	≤ 0.50 or 30 seconds	Check sensitivity of system. Reanalyze .
	Recovery	50 - 200%	
Precision/ Accuracy	LCS per batch	Historical lab data. See Table 12.	Check calculations. Reanalyze. Assess impact on data. Narrate.
	MS/MSD per batch	Historical lab data. See Table 12	Check calculations. Reanalyze. Assess impact on data.
	Surrogates	Historical lab data. See Table 12	Check calculations. Reanalyze. Assess impact on data.
Holding Time		14 days	

(1) Practical Quantitation Limits (PQLs) for Method 8260B are listed as Reporting Limits (RLs) in Table 39 of this Attachment.

(2) Except for common lab contaminants: methylene chloride, acetone, and 2-butanone may be reported with qualifiers if the concentration of the analyte is less than five times the PQL. Such action must be addressed in the case narrative.

Table 12 - Control Limits for SW 846 Method 8260B[1] GC/MS for Volatile Organics

Historical Limits

	Compound	Accuracy	Precision
LCS			
	1,1-Dichloroethene	75-113	NA
	Benzene	78-116	NA
	Trichloroethene	70-110	NA
	Toluene	78-126	NA
	Chlorobenzene	81-115	NA
MS/MSD			
	1,1-Dichloroethene	75-113	20
	Benzene	78-116	20
	Trichloroethene	70-110	20
	Toluene	78-126	20
	Chlorobenzene	81-115	20
Surrogates			
	1,2-Dichoroethane-d4	76-114	N/A
	Toluene-d8	88-110	N/A
	4-Bromofluorobenzene	86-115	N/A

(1) Practical Quantitation Limits (PQLs) for Method 8260B are listed as Reporting Limits (RLs) in Table 39 of this Attachment.

(2) Except for common lab contaminants: methylene chloride, acetone, and 2-butanone may be reported with qualifiers if the concentration of the analyte is less than five times the PQL. Such action must be addressed in the case narrative.

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 13 - Summary Quality Control and Calibration Criterion SW 846 Method 8270CGC/MS for Semi-Volatile Organics

Quality Parameter	Method/ Frequency	Criteria	Corrective Action
Method Blank	1 per analytical batch	< PQL[1] [2]	Reanalyze. Assess date, Narrate.
Instrument Tune	Every 12 hours, initially and as required	As per 8270C	Retune instrument. Repeat DFTPP analysis.
Initial Calibration, Five point	SPCC RRF	≥ 0.050	Evaluate system. Recalibrate.
	CCC	RSD ≤ 30%	
	Other compounds: <15% RSD	Average RF	
	Other compounds: >15% RSD	Linear Curve	
Continuing Calibration	SPCC RRF	Same as initial	Evaluate system. Repeat calibration check. Recalibrate. Reanalyze affected samples.
	CCC	RSD ≤ 20%	
Internal Standards	RRT	± 30 seconds	Check sensitivity of system. Reanalyze
	Accuracy	50 - 200%	
Precision/ Accuracy	LCS per batch	Historical lab data. See Table 14	Check calculations. Reanalyze. Assess data, Narrate.
	MS/MSD per batch.	Historical lab data. See Table 14	Check calculations. Reanalyze. Assess data, Narrate.
	Surrogates	Historical lab data. See Table 14	Check calculations. Reanalyze. Assess data, Narrate.
Holding Time		Extraction - 14 days Analysis - 40 days	

(1) Practical Quantitation Limits (PQLs) for Method 8270C are listed as Reporting Limits (RLs) in Tables 33 and 34 of this Attachment.

(2) Except for common lab contaminants: Phthalate esters may be reported with qualifiers if the concentration of the analyte is less than five times the PQL. Such action must be addressed in the case narrative

Table 14 - Historical Control Limits for Method 8270C GC/MS for Semi-Volatile Organics

	Compound	Accuracy Aqueous	Compound	Accuracy Aqueous	RPD
LCS			**MS/MSD**		
	Phenol	20-49	Phenol	20-49	21
	2-Chlorophenol	57-102	2-Chlorophenol	57-102	23
	1,4-Dichlorobenzene	50-98	1,4-Dichlorobenzene	50-98	19
	N-nitrosodi-n-propylamine	51-108	N-nitrosodi-n-propylamine	51-108	20
	1,2,4-Trichlorobenzene	51-102	1,2,4-Trichlorobenzene	51-102	19
	4-Chloro-3-methylphenol	59-118	4-Chloro-3-methylphenol	59-118	17
	Acenaphthene	62-111	Acenaphthene	62-111	16
	4-Nitrophenol	10-68	4-Nitrophenol	10-68	37
	2,4-Dinitrotoluene	51-116	2,4-Dinitrotoluene	51-116	15
	Pentachlorophenol	35-128	Pentachlorophenol	35-128	26
	Pyrene	56-137	Pyrene	56-137	23
Surrogates					
	Nitrobenzene-d5	49-112			
	2-Fluorobiphenyl	49-106			
	Terphenyl-d14	53-124			
	Phenol-d5	17-51			
	2-Fluorophenol	21-89			
	2,4,6-Tribromophenol	54-114			

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 15 - Summary Quality Control and Calibration Criterion SW 846 Method 6010B, TCLP Methods: ICP Metals

Quality Parameter	Method/ Frequency	Criteria	Corrective Action
Initial Calibration	Calibration blank + one standard. Daily prior to analysis	± 5% RSD	Evaluate system and recalibrate
Calibration Blank	After initial calibration and each calibration	< PQL(1)	Evaluate system and recalibrate
ICP Interference Check	Run at beginning of daily run; after 8 hours and/or end of run	80-120%	Reanalyze. Recalibrate. Reanalyze affected samples.
Initial Calibration Verification (ICV)	After calibration	±10% of expected response	Evaluate system and recalibrate
Continuing Calibration Verification (CCV)	Every 10 samples and end of run sequence	±10% of expected response	Reanalyze CCV. Recalibrate. Reanalyze affected samples.
Method Blank	1 per analytical batch	< PQL	Reanalyze. Reextract and reanalyze as necessary, including affected samples
LCS[2]	1 per analytical batch	Historical lab data. See Table 16	Check calculations. Reextract and reanalyze as necessary. Assess data and narrate.
MS/MSD[2]	1 per analytical batch.	See Table 16	Check calculations. Assess impact on data and narrate.
Holding Time		180 days to analysis.	

(1) Practical Quantitation Limits (PQLs) for Method 6010B are listed as Control Limits in Table 16 of this Attachment. For Method 7470A, the PQLs are provided in Tables 28, 30, and 32.

(2) The QC batching for aqueous and TCLP matrices includes an LCS and MS/MSD.

Table 16 - Control Limits for SW 846 6010B, TCLP, and 3500 Series Methods: ICP Metals

Historical Limits

	Compound	Accuracy Aqueous	Accuracy TCLP	Precision
LCS	Aluminum	88-119	88-119	NA
	Antimony	89-110	89-110	NA
	Arsenic	88-109	88-109	NA
	Barium	89-110	89-110	NA
	Beryllium	86-110	86-110	NA
	Boron	83-106	83-106	NA
	Cadmium	90-110	90-110	NA
	Chromium	86-113	86-113	NA
	Cobalt	87-119	87-119	NA
	Copper	91-111	91-111	NA
	Lead	87-117	87-117	NA
	Manganese	89-116	89-116	NA
	Nickel	90-112	90-112	NA
	Selenium	87-112	87-112	NA
	Silver	91-112	91-112	NA
	Thallium	90-117	90-117	NA
	Tin	85-110	85-110	NA
	Vanadium	87-119	87-119	NA
	Zinc	90-114	90-114	NA
MS/MSD				
	Aluminum	88-119	88-119	13
	Antimony	89-110	89-110	10
	Arsenic	88-109	88-109	10
	Barium	89-110	89-110	11
	Beryllium	86-110	86-110	13
	Boron	83-106	83-106	11
	Cadmium	90-110	90-110	11
	Chromium	86-113	86-113	11
	Cobalt	87-119	87-119	11
	Copper	91-111	91-111	10
	Lead	87-117	87-117	14
	Manganese	89-116	89-116	12
	Nickel	90-112	90-112	10
	Selenium	87-112	87-112	10
	Silver	91-112	91-112	10
	Thallium	90-117	90-117	11
	Tin	85-110	85-110	11
	Vanadium	87-119	87-119	11
	Zinc	90-114	90-114	10

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 17 - Summary Quality Control and Calibration Criterion SW 846 Methods 7470A and TCLP Mercury by Cold Vapor

Quality Parameter	Method/ Frequency	Criteria	Corrective Action
Initial Calibration	Blank and five standards. Daily before analysis	Correlation Coefficient ≥ 0.995	Evaluate system and recalibrate.
Calibration Blank	After initial calibration and each calibration	< PQL(1)	Reanalyze. Recalibrate. Reanalyze affected samples.
Initial Calibration Verification (ICV)	After calibration	80-120%	Evaluate system and recalibrate
Continuing Calibration Verification (CCV)	Every 10 samples and end of run sequence	80-120%	Reanalyze. Recalibrate. Reanalyze affected samples.
Method Blank	1 per analytical batch	< PQL	Check calculations. Reextract and reanalyze as necessary. Assess data and narrate
LCS	1 per analytical batch	76-117% (aqueous) 75-125% (TCLP)	Check calculations. Reextract and reanalyze as necessary. Assess data and narrate.
MS/MSD	1 per analytical batch (20 samples).	76-117% (aqueous) 75-125% (TCLP)	Check calculations. Assess impact on data and narrate.
Practical Quantitation Limit	Multiple Metals Train Aqueous Samples Solid Samples	0.2 µg/fraction 0.0002 mg/L 0.1 mg/Kg	
Holding Time		28 days to analysis.	

(1) Practical Quantitation Limits (PQLs) for Method 7470A are listed as Reporting Limits (RLs) in Tables 28, 30, and 32 of this Attachment.

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 18. Summary of QA/QC Criteria for Dioxins by Method 8290

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Initial Calibration	Five point calibration initially and as required	Int Std RSD ≤ 30% Natives RSD ≤ 20%	Evaluate system. Recalibrate.
Continuing Calibration	Midpoint standard at start of each 12 hour sequence	%D of IS ≤ 30% from avg RRF (ICAL); %D of natives ≤ 20% from avg RRF (ICAL).	Evaluate system. Reanalyze CCAL. Recalibrate as necessary. Reanalyze samples.
Window Defining Mix (WDM) Column Performance Check Solution	Prior to ICAL, once per 12 hours prior to sample analysis	Used to set retention times. CPSM must have <25% valley resolution for 2,3,7,8-TCDD	Readjust windows. Evaluate system. Perform maintenance. Reanalyze WDM/CPSM.
Initial Calibration Blank (ICB) Continuing Calibration Blank (CCB)	With initial and continuing calibration	< PQL(1)	Evaluate system. Reanalyze. Recalibrate as necessary. Reanalyze samples.
Method Blanks	1 per analytical batch	< PQL	Reanalyze. Re-prepare samples.
Internal Standards	Every sample	40 - 135% for tetra and hexa isomers; 25 - 150% for Hepta and octa isomers.	Check chromatogram for interference. Check instrument and reanalyze if necessary. Check signal-to-noise, if < 10:1 process archive sample. Assess impact on data and narrate
LCS	1 per analytical batch	60 - 140% for target analytes	Check calculations. Reanalyze. Assess impact on data. Narrate.
MS/MSD	1 per agent trial burn	60 - 140% recovery for target analytes; RPD ≤ 20%	Check calculations. Reanalyze. Assess impact on data.
Holding Time		30 days extraction 45 days analysis	

(1) Practical Quantitation Limits (PQLs) for Method 8290 are listed as Reporting Limits (RLs) in Table 38 of this Attachment.

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 19 - Analytical Methods

PARAMETER	MATRIX	PREPARATION METHOD	ANALYSIS METHOD
VOCs	Tenax™ and Anasorb™-747	5041A	5041A
SVOCs	XAD-2™/filter/cond./rinses	0010	8270C
PCDDs/PCDFs	XAD-2™/filter/rinses	0023A	0023A
Volatile TOC	Bag/Condensate	0040/5030A	GC/FID
Semi-Volatile TOC	XAD-2™/filter/cond.rinses	0010	GC/FID
Non-Volatile TOC	XAD-2™/filter/cond./rinses	None	Gravimetrically
VOCs	SMVOC condensate	5030B	8260B
TCLP SVOCs	Brine/residue	1311/3510C/3540C	8270C
HRA Metals	Brine	3010A/3050B	6010B/7470A
TCLP Metals	Brine/residue	1311/3010A/7470A	6010B/7470A
TCLP VOCs	Brine/residue	1311/5030B	8260B
HF, HCl/Cl_2	Impinger Solutions/rinse	9057	9057
HRA Metals	Filter/Impinge solution/rinse	0060	6020/7470A
Particulate Matter (PM)	Filter/rinse	Method 5i	Method 5i

Table 20 - Target Analyte List for Analysis of Exhaust Gas Samples for Volatile Organic Compounds (VOCs) by Method 5041A

Acetone	1,2-Dichloropropane
Benzene	cis-1,3-Dichloropropene
Bromodichloromethane	trans-1,3-Dichloropropene
Bromoethene (Vinyl Bromide)[a]	Ethylbenzene
Bromoform	n-Hexane[a]
Bromomethane	2-Hexanone
2-Butanone	Iodomethane
1,3-Butadiene[a]	Methylene chloride
Carbon disulfide	4-Methyl-2-pentanone
Carbon tetrachloride	2-Propanol
Chlorobenzene	Styrene
Chlorodibromomethane	1,1,1,2-Tetrachloroethane
Chloroethane	1,1,2,2-Tetrachloroethane
Chloroform	Tetrachloroethene
Chloromethane	1,1,2-Trichloro-1,2,2-trifluoroethane[a]
2-Chloropropane[a]	Toluene
1,2-Dibromoethane	1,1,1-Trichloroethane
Dibromomethane	1,1,2-Trichloroethane
trans-1,4-Dichloro-2-butene	Trichloroethene
cis-1,1-Dichloro-2-butene	
Dichlorodifluoromethane	1,2,3-Trichloropropane
1,1-Dichloroethane	Trichlorofluoromethane
1,2-Dichloroethane	Vinyl acetate[a]
1,1-Dichloroethene	Vinyl chloride
trans-1,2-Dichloroethene	Xylenes (total)

[a] Response factor is obtained from a single analysis of the standard for this compound analyzed at a minimum of once per year. No method detection limit study or demonstration of capability are required.

Table 21 - Target Analyte List for Analysis of Exhaust Gas Samples for Semivolatile Organic Compounds (SVOCs) by Method 8270C

Acenaphthene	1,3-Dichlorobenzene	4-Methylphenol
Acenaphthylene	1,4-Dichlorobenzene	Pentachloroethane
Acetophenone	3,3'-Dichlorobenzidine	Naphthalene
2-Acetylaminofluorene	2,4-Dichlorophenol	1,4-Naphthoquinone
4-Aminobyphenyl	2,6-Dichlorophenol	1-Naphthylamine
3-Amino-9-ethylcarbozole[a]	Diethyl phthalate	2-Naphthylamine
Aniline	Dihydrosaffrole[a]	5-Nitroacenaphthene[a]
Anthracene	Dimethylaminoazobenzene	2-Nitroaniline
Aramite	7,12-Dimethylbenz(a)anthracene	3-Nitroaniline
Benzidine[a]	3,3'-Dimethylbenzidine	4-Nitroaniline
Benzoic acid[b]	∝,∝-Dimethylphenethylamine	Nitrobenzene
Benz(a)anthracene	2,4-Dimethyl phenol	2-Nitrophenol
Benzo(b)fluoroanthene	Dimethyl phthalate	4-Nitrophenol
Benzo(j)fluoroanthene[a]	1,3-Dinitrobenzene	5-Nitro-o-toluidine
Benzo(k)fluoroanthene	4,6-Dinitro-2-methylphenol	4 Nitroquinoline-1-oxide[b]
Benzo(g,h,i)perylene	2,4-Dinitrophenol[d]	N-Nitrosodibutylamine
Benzo(a)pyrene	2,4-Dinitrotoluene	N-Nitrosodiethylamine
Benzo(e)pyrene[a]	2,6-Dinitrotoluene	N-Nitrosodimethylamine
Benzyl alcohol	Dioxathion[a]	N-Nitrosomethylethylamine
Benzaldedhyde[a]	Diphenylamine	N-Nitrosodiphenylamine[d]
Benzenthiol[a]	1,2-Diphenylhydrazine[a]	N-Nitroso-di-n-propylamine
Biphenyl[c]	Di-n-octyl phthalate	N-Nitrosomorpholine[a]
Bis(2-chloroethoxy)methane	Ethyl methanesulfonate	N-Nitrosopiperidine
Bis(2-chloroethyl)ether	Ethyl parathion	N-Nitrosophyrrolidine
Bis(2-chloroisopropyl)ether	Fluoroanthene	Pentachlorobenzene
Bis(2-ethylhexy)phthalate	Fluorene	Pentachloronitrobenzene
4-Bromophenyl phenyl ether	Heptachlor[c]	Pentachlorophenol
Butyl benzyl phthalate	Hexachlorobenzene	Phenacetin
2-sec-Butyl-4,6-dinitrophenol	Hexachlorobutadiene	Phenanthrene
4-Chloroaniline	Hexachlorocyclopentadiene	Phenol
Chlorobenzilate	Hexachloroethane	1,4-Phenylenediamine[a]
4-Chloro-3-methylphenol	Hexachlorophene[c]	2-Picoline
1-Chloronaphthalene[a]	Hexachloropropene	Pronamide
2-Chloronaphthalene	Indeno(1 ,2,3-cd)pyrene	Pyrene
2-Chlorophenol	Isophorone	Pyridine
4-Chlorophenyl phenyl ether	Isosafrole	Quinoline[c]
Chrysene	Methapyrilene[a]	Safrole[a]
4-4'-DDE[a]	Methoxyclor[a]	1,2,4,5-Tetrachlorobenzene
Diallate (cis or trans)	Methycyclohexane[a]	2,3,4,6-Tetrachlorophenol
Dibenz(a,j)acridine[a]	3-Methylcholanthrene	o-Toluidine[a]
Dibenz(a,h)anthracene	Methyl methanesulfonate	p-Toluidine
Dibenzofuran	2-Methylnaphthalene	1,2,4-Trichlorobenzene
1,2-Dibromo-3-chloropropane[a]	2-Methyl-5-nitroaniline[a]	2,4,5-Trichlorophenol
Di-n-butyl phthalate	2-Methylphenol	2,4,6-Trichlorophenol
1,2-Dichlorobenzene	3-Methylphenol	1,3,5-Trinitrobenzene
n,n'-Diisopropylcarbodiimide[a]	Diisopropyl methylphosphonate[a]	Tributylamine[c]

[a] No method detection limit study or demonstration of capability required
[b] Response factor is derived from a 4-point calibration curve
[c] Response factor is based on historical data
[d] N-Nitrosodiphenylamine decomposes to diphenylamine. Laboratory quantifies as diphenylamine.

Table 22 - Summary QA/QC Criteria for COD (410)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Demonstrated Ability	LCS	80% - 120%	Check calculations. Reanalyze. Assess impact on data. Narrate
Lab Blanks	Method Blank	< Reporting limit	Reanalyze. Re-prepare samples.
Precision and Accuracy	LCS per batch	80% - 120% Rec	Check calculations. Reanalyze. Assess impact on data. Narrate
	MS per batch	70% - 130%	Check calculations. Reanalyze. Assess impact on data. Narrate
	Duplicate per batch	± 30% RPD	Check calculations. Reanalyze. Assess impact on data. Narrate
Holding Time		28 Days	

Table 23 - Summary QA/QC Criteria for Reactive Cyanide (9014)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Demonstrated Ability	LCS	80% - 120%	Check calculations. Reanalyze. Assess impact on data. Narrate
Lab Blanks	Method Blank	< Reporting limit	Reanalyze. Re-prepare samples.
Precision and Accuracy	LCS per batch	80% - 120% Rec	Check calculations. Reanalyze. Assess impact on data. Narrate
	Duplicate per batch	± 30% RPD	Check calculations. Reanalyze. Assess impact on data. Narrate
Holding Time		14 Days	Check calculations. Reanalyze. Assess impact on data. Narrate

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 24 - Summary QA/QC Criteria for Reactive Sulfide (9034)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Demonstrated Ability	LCS	80% - 120%	Check calculations. Reanalyze. Assess impact on data. Narrate
Lab Blanks	Method Blank	< Reporting limit	Reanalyze. Re-prepare samples.
Precision and Accuracy	LCS per batch	80% - 120% Rec	Check calculations. Reanalyze. Assess impact on data. Narrate
	Duplicate per batch	Brine/water - TCLP leachate Brine/water - TCLP leachate ± 30% RPD	Check calculations. Reanalyze. Assess impact on data. Narrate
Holding Time		14 Days	

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 25 - Summary QA/QC Criteria for TCLP Pesticides (8081A)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Laboratory Blank	1 per preparation batch	< PQL(1)	Reanalyze. Re-prepare samples
Initial Calibration	5 point	%RSD ≤ 25%	Evaluate system. Recalibrate.
Continuing Calibration	every 12 hours	CF %D ± 15%	Evaluate system. Reanalyze CCAL. Recalibrate as necessary. Reanalyze samples.
Laboratory Control Sample (LCS), Accuracy	2 per preparation batch	70 - 130%	Check calculations. Reanalyze. Assess impact on data. Narrate
LCS, Precision	2 per preparation batch	± 30% RPD	Check calculations. Reanalyze. Assess impact on data. Narrate
Surrogates, Accuracy	Every Sample	60 - 150%	Check calculations. Reanalyze. Assess impact on data. Narrate
Holding Times		14 days to extract	

(1) Practical Quantitation Limits (PQLs) are listed as Reporting Limits (RLs) in Tables 27 to 41 of this Attachment.

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 26 - Summary QA/QC Criteria for TCLP Herbicides (8151A)

Quality Parameter	Method/Frequency	Criteria	Corrective Action
Laboratory Blank	1 per preparation batch	< PQL[(1)]	Reanalyze. Re-prepare samples
Initial Calibration	5 point	%RSD ≤ 25%	Evaluate system. Recalibrate.
Continuing Calibration	every 12 hours	CF %D ± 15%	Evaluate system. Reanalyze CCAL. Recalibrate as necessary. Reanalyze samples.
Laboratory Control Sample (LCS), Accuracy	2 per preparation batch	70 - 130%	Check calculations. Reanalyze. Assess impact on data. Narrate
LCS, Precision	2 per preparation batch	± 30% RPD	Check calculations. Reanalyze. Assess impact on data. Narrate
Surrogates, Accuracy	Every Sample	30 - 100%	Check calculations. Reanalyze. Assess impact on data. Narrate
Holding Times		14 days to extract	

(1) Practical Quantitation Limits (PQLs) are listed as Reporting Limits (RLs) in Tables 27 to 41 of this Attachment.

The SW-846 methods require that the laboratory establish recovery limits based on statistical analysis of actual samples and that the limits be updated over time (annually) to reflect actual laboratory performance. The most recent updated limits established by the laboratory will be used as applicable.

Table 27. Method 6020 Practical Quantitation Limits[1]

Structured Analysis Code: I-04-MH-01-07

Target Analyte List: SAC: MET 6020 ICPMS Full List

Matrix: WATER
Extraction: METALS, TOTAL RECOVERABLE
Method: Inductively Coupled Plasma Mass Spectrometry(6020)
QC Program: STANDARD TEST SET
Location: STL Sacramento

Target List 20905		Detection Limits					Check List 20950							Spike List 20951					
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
88	Aluminum	0.05	mg/L	0.0021	mg/L	20000323	C	Y	1.0	mg/L	88	119	13	C	Y	1.0	mg/L	88	119	13
128	Antimony	0.002	mg/L	0.000038	mg/L	20000323	C	Y	0.05	mg/L	89	110	10	C	Y	0.05	mg/L	89	110	10
140	Arsenic	0.002	mg/L	0.00050	mg/L	20000323	C	Y	0.2	mg/L	88	109	10	C	Y	0.2	mg/L	88	109	10
194	Barium	0.001	mg/L	0.00096	mg/L	20000323	C	Y	0.2	mg/L	89	110	11	C	Y	0.2	mg/L	89	110	11
222	Beryllium	0.001	mg/L	0.000071	mg/L	20000323	C	Y	0.2	mg/L	86	110	13	C	Y	0.2	mg/L	86	110	13
313	Boron	0.05	mg/L	0.0063	mg/L	20000323		Y	1.0	mg/L	83	106	11		Y	1.0	mg/L	83	106	11
411	Cadmium	0.001	mg/L	0.000074	mg/L	20000323	C	Y	0.2	mg/L	90	110	11	C	Y	0.2	mg/L	90	110	11
413	Calcium	0.05	mg/L	0.015	mg/L	20000323	C	Y	1.0	mg/L	80	120	20	C	Y	1.0	mg/L	80	120	20
3489	Cerium	0.005	mg/L	0.000048	mg/L	20020130		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3488	Cesium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2952	Chromium	0.002	mg/L	0.00092	mg/L	20000323	C	Y	0.2	mg/L	86	113	11	C	Y	0.2	mg/L	86	113	11
637	Cobalt	0.001	mg/L	0.000057	mg/L	20000323	C	Y	0.2	mg/L	87	119	11	C	Y	0.2	mg/L	87	119	11
643	Copper	0.002	mg/L	0.000058	mg/L	20000323	C	Y	0.2	mg/L	91	111	10	C	Y	0.2	mg/L	91	111	10
3911	Dysprosium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3912	Erbium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3913	Europium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3914	Gadolinium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3915	Gallium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3916	Germanium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
1464	Gold	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3917	Hafnium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3918	Holmium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3921	Iridium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
1539	Iron	0.05	mg/L	0.017	mg/L	20000323	C	Y	1.0	mg/L	90	120	12	C	Y	1.0	mg/L	90	120	12
3922	Lanthanum	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
1605	Lead	0.001	mg/L	0.000066	mg/L	20000323	C	Y	0.2	mg/L	87	117	14	C	Y	0.2	mg/L	87	117	14
1616	Lithium	0.005	mg/L	0.00065	mg/L	20000323		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3923	Lutetium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
1618	Magnesium	0.05	mg/L	0.00079	mg/L	20000323	C	Y	1.0	mg/L	80	120	20	C	Y	1.0	mg/L	80	120	20
1659	Manganese	0.001	mg/L	0.000085	mg/L	20000323	C	Y	0.2	mg/L	89	116	12	C	Y	0.2	mg/L	89	116	12
1701	Mercury	0.0002	mg/L	0.000035	mg/L	20000323		Y	0.005	mg/L	80	120	20		Y	0.005	mg/L	80	120	20
1906	Molybdenum	0.001	mg/L	0.00060	mg/L	20000323	C	Y	0.2	mg/L	85	113	19	C	Y	0.2	mg/L	85	113	19
3490	Neodymium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
1956	Nickel	0.002	mg/L	0.000098	mg/L	20000323	C	Y	0.2	mg/L	90	112	10	C	Y	0.2	mg/L	90	112	10
3924	Niobium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3925	Palladium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2200	Phosphorus	0.05	mg/L	0.032	mg/L	19980430	C	Y	1	mg/L	80	120	20	C	Y	1	mg/L	80	120	20
2209	Platinum	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2214	Potassium	0.05	mg/L	0.0040	mg/L	20000323	C	Y	1.0	mg/L	80	120	20	C	Y	1.0	mg/L	80	120	20
3926	Praseodymium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3927	Rhenium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20

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(1) RL (Reportable Limit) is the PQL

Table 27. Method 6020 Practical Quantitation Limits (Continued)

Structured Analysis Code: I-04-MH-01-07

Target Analyte List: SAC: MET 6020 ICPMS Full List

Matrix: WATER
Extraction: METALS, TOTAL RECOVERABLE
Method: Inductively Coupled Plasma Mass Spectrometry(6020)
QC Program: STANDARD TEST SET
Location: STL Sacramento

Target List 20905		Detection Limits				Check List 20950							Spike List 20951						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
3928	Rhodium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3929	Rubidium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3930	Ruthenium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3931	Samarium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3932	Scandium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2281	Selenium	0.002	mg/L	0.0017	mg/L	20000323	C	Y	0.2	mg/L	87	112	10	C	Y	0.2	mg/L	87	112	10
2285	Silver	0.001	mg/L	0.00003	mg/L	20000323	C	Y	0.05	mg/L	91	112	10	C	Y	0.05	mg/L	91	112	10
2315	Sodium	0.05	mg/L	0.011	mg/L	20000323	C	Y	1.0	mg/L	80	120	20	C	Y	1.0	mg/L	80	120	20
2353	Strontium	0.005	mg/L	0.00028	mg/L	20000323		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3933	Tantalum	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3742	Tellurium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3934	Terbium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2477	Thallium	0.001	mg/L	0.00034	mg/L	20000323	C	Y	0.05	mg/L	90	117	11	C	Y	0.05	mg/L	90	117	11
3935	Thorium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
4189	Thulium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2479	Tin	0.01	mg/L	0.0014	mg/L	20000323	C	Y	0.2	mg/L	85	110	11	C	Y	0.2	mg/L	85	110	11
2482	Titanium	0.002	mg/L	0.00043	mg/L	20000323	C	Y	0.2	mg/L	80	120	20	C	Y	0.2	mg/L	80	120	20
2602	Tungsten	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
3827	Uranium	0.005	mg/L	0.00006	mg/L	20000323		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2607	Vanadium	0.01	mg/L	0.0031	mg/L	20000323	C	Y	0.2	mg/L	87	119	11	C	Y	0.2	mg/L	87	119	11
3936	Ytterbium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2726	Yttrium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20
2649	Zinc	0.005	mg/L	0.0010	mg/L	20000323	C	Y	0.2	mg/L	90	114	10	C	Y	0.2	mg/L	90	114	10
2651	Zirconium	0.005	mg/L	0.001	mg/L	19990628		Y	0.2	mg/L	80	120	20		Y	0.2	mg/L	80	120	20

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(1) RL (Reportable Limit) is the PQL

Table 28. Method 7470a Practical Quantitation Limits[1]

Structured Analysis Code: I-19-08-01-07
Target Analyte List: All Analytes

Matrix: WATER
Extraction: METALS, TOTAL (Method exclusive) - Waters
Method: Mercury (7470A, Cold Vapor) - Liquid
QC Program: STANDARD TEST SET
Location: STL Sacramento

Analyte List		Detection Limits					Check List 20982							Spike List 20983						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
1701	Mercury	0.0002	mg/L	0.00004	mg/L	19980619	C	Y	0.001	mg/L	76	117	19	C	Y	0.001	mg/L	79	119	20

(1) RL (Reportable Limit) is the PQL

Table 29. ICPMS 6020 Practical Quantitation Limits[1]

Structured Analysis Code: S-DF-MH-3V-07

Target Analyte List: SAC. MET 6020 ICPMS Full List

Matrix: AIR
Extraction: METALS, TOTAL: Airwains,Back Half
Method: Inductively Coupled Plasma Mass Spectrometry(6020)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

Target List 20905		Detection Limits				Check List 20950							Spike List 20951						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
88	Aluminum	50	ug	2.1	ug	20000323	C	Y	1000	ug	83	121	20	C	Y	1000	ug	83	121	20
128	Antimony	2.0	ug	0.036	ug	20000323	C	Y	50	ug	79	108	29	C	Y	50	ug	79	108	29
140	Arsenic	2.0	ug	0.50	ug	20000323	C	Y	200	ug	79	107	20	C	Y	200	ug	79	107	20
194	Barium	1.0	ug	0.96	ug	20000323	C	Y	200	ug	87	108	20	C	Y	200	ug	87	108	20
222	Beryllium	1.0	ug	0.078	ug	20000323	C	Y	200	ug	73	108	20	C	Y	200	ug	73	108	20
313	Boron	10	ug	6.3	ug	20000323		Y	1000	ug	73	120	22		Y	1000	ug	73	120	22
411	Cadmium	1.0	ug	0.074	ug	20000323	C	Y	200	ug	81	106	20	C	Y	200	ug	81	106	20
413	Calcium	50	ug	15	ug	20000323	C	Y	1000	ug	77	122	20	C	Y	1000	ug	77	122	20
3489	Cerium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3488	Cesium	5.0	ug	5.0	ug	19980609		Y	200	ug	88	108	23		Y	200	ug	88	108	23
2952	Chromium	2.0	ug	0.92	ug	20000323	C	Y	200	ug	82	119	20	C	Y	200	ug	82	119	20
637	Cobalt	1.0	ug	0.057	ug	20000323	C	Y	200	ug	85	120	20	C	Y	200	ug	85	120	20
643	Copper	2.0	ug	0.056	ug	20000323	C	Y	200	ug	90	110	20	C	Y	200	ug	90	110	20
3911	Dysprosium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3912	Erbium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3913	Europium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3914	Gadolinium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3915	Gallium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3916	Germanium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
1464	Gold	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3917	Hafnium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3918	Holmium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3921	Iridium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
1539	Iron	50	ug	17	ug	20000323	C	Y	1000	ug	74	116	20	C	Y	1000	ug	74	116	20
3922	Lanthanum	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
1605	Lead	1.0	ug	0.066	ug	20000323	C	Y	200	ug	85	113	20	C	Y	200	ug	85	113	20
1616	Lithium	5.0	ug	0.849	ug	20000323		Y	200	ug	81	119	23		Y	200	ug	81	119	23
3923	Lutetium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
1618	Magnesium	5.0	ug	0.79	ug	20000323	C	Y	1000	ug	83	109	20	C	Y	1000	ug	83	109	20
1659	Manganese	1.0	ug	0.087	ug	20000323	C	Y	200	ug	82	122	20	C	Y	200	ug	82	122	20
1701	Mercury	0.2	ug	0.035	ug	20000323		Y	5.0	ug	75	125	20		Y	5.0	ug	75	125	20
1906	Molybdenum	1.0	ug	0.60	ug	20000323	C	Y	200	ug	75	125	20	C	Y	200	ug	75	125	20
3490	Neodymium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
1956	Nickel	2.0	ug	0.098	ug	20000323	C	Y	200	ug	90	110	20	C	Y	200	ug	90	110	20
3924	Niobium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3925	Palladium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
2200	Phosphorus	50	ug	50	ug	19980609	C	Y	1000	ug	77	119	20	C	Y	1000	ug	77	119	20
2209	Platinum	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
2214	Potassium	50	ug	4.0	ug	20000323	C	Y	1000	ug	86	107	20	C	Y	1000	ug	86	107	20
3926	Praseodymium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3927	Rhenium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20

(1) RL (Reportable Limit) is the PQL

Table 29. ICPMS 6020 Practical Quantitation Limits Continued

Structured Analysis Code: S-DF-MH-3V-07

Target Analyte List: SAC: MET 6020 ICPMS Full List

Matrix: AIR
Extraction: METALS, TOTAL: Airtrains,Back Half
Method: Inductively Coupled Plasma Mass Spectrometry(6020)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

Target List 20905		Detection Limits				Check List 20950							Spike List 20951						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
3928	Rhodium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3929	Rubidium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3930	Ruthenium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3931	Samarium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3932	Scandium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
2281	Selenium	2.0	ug	1.7	ug	20000323	C	Y	200	ug	67	114	20	C	Y	200	ug	67	114	20
2285	Silver	1.0	ug	0.03	ug	20000323	C	Y	50	ug	85	108	20	C	Y	50	ug	85	108	20
2315	Sodium	50	ug	11	ug	20000323	C	Y	200	ug	81	123	35	C	Y	200	ug	81	123	35
2353	Strontium	5.0	ug	0.28	ug	20000323		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3933	Tantalum	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3742	Tellurium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3934	Terbium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
2477	Thallium	1.0	ug	0.341	ug	20000323	C	Y	50	ug	88	116	20	C	Y	50	ug	88	116	20
3935	Thorium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
4189	Thulium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
2479	Tin	10	ug	1.42	ug	20000323	C	Y	200	ug	81	113	20	C	Y	200	ug	81	113	20
2482	Titanium	2.0	ug	0.43	ug	20000323	C	Y	200	ug	85	105	20	C	Y	200	ug	85	105	20
2602	Tungsten	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
3827	Uranium	5.0	ug	0.067	ug	20000323		Y	200	ug	75	125	20		Y	200	ug	75	125	20
2607	Vanadium	10	ug	3.112	ug	20000323	C	Y	200	ug	79	121	20	C	Y	200	ug	79	121	20
3936	Ytterbium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
2726	Yttrium	5.0	ug	5.0	ug	19980609		Y	200	ug	75	125	20		Y	200	ug	75	125	20
2649	Zinc	5.0	ug	1.0	ug	20000323	C	Y	200	ug	78	112	20	C	Y	200	ug	78	112	20
2651	Zirconium	5.0	ug	5.0	ug	19980609		Y	200	ug	86	119	20		Y	200	ug	86	119	20

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Protocol [illegible]

(1) RL (Reportable Limit) is the PQL

Table 30. Method 7470a Cold Vapor Practical Quantitation Limits[1]

Structured Analysis Code: S-EA-08-3V-07

Target Analyte List: All Analytes

Matrix: AIR
Extraction: MERCURY, EMPTY Airbains, Back Half
Method: Mercury (7470A, Cold Vapor) - Liquid
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

Analyte List		Detection Limits					Check List 20982							Spike List 20983						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
4846	Hg (Empty)	0.2	ug	0.049	ug	19980616	C	Y	1.0	ug	81	121	20	C	Y	1.0	ug	81	121	20

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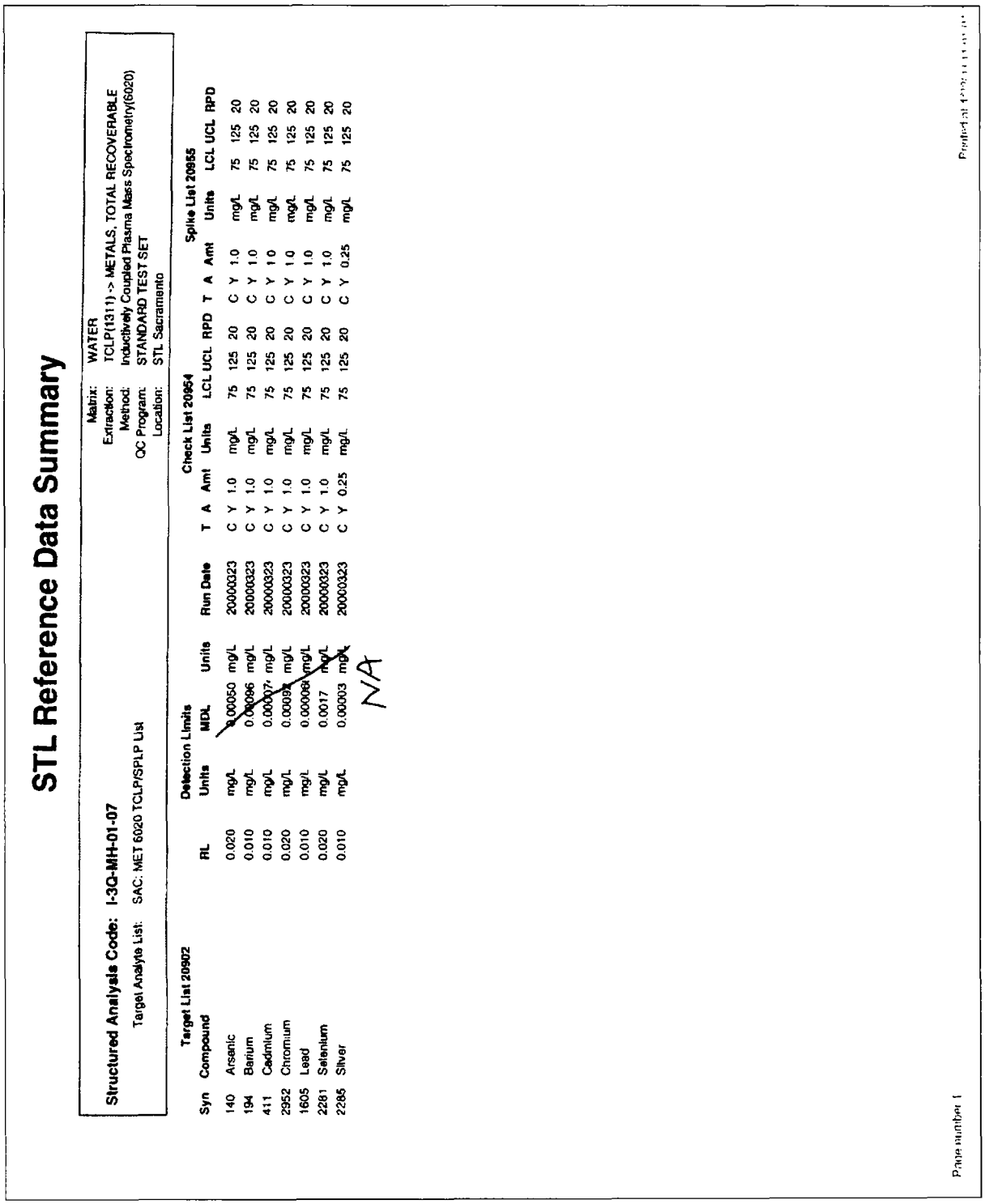
(1) RL (Reportable Limit) is the PQL

Table 31. Method 6020 TCLP SCLP Practical Quantitation Limits[1]



STL Reference Data Summary

Structured Analysis Code: I-3Q-MH-01-07

Target Analyte List: SAC: MET 6020 TCLP/SPLP List

Matrix: WATER
Extraction: TCLP(1311) -> METALS, TOTAL RECOVERABLE
Method: Inductively Coupled Plasma Mass Spectrometry(6020)
QC Program: STANDARD TEST SET
Location: STL Sacramento

Target List 20902			Detection Limits			Check List 20954									Spike List 20955						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
140	Arsenic	0.020	mg/L	0.00050	mg/L	20000323	C	Y	1.0	mg/L	75	125	20	C	Y	1.0	mg/L	75	125	20
194	Barium	0.010	mg/L	0.00086	mg/L	20000323	C	Y	1.0	mg/L	75	125	20	C	Y	1.0	mg/L	75	125	20
411	Cadmium	0.010	mg/L	0.00007	mg/L	20000323	C	Y	1.0	mg/L	75	125	20	C	Y	1.0	mg/L	75	125	20
2952	Chromium	0.020	mg/L	0.00032	mg/L	20000323	C	Y	1.0	mg/L	75	125	20	C	Y	1.0	mg/L	75	125	20
1605	Lead	0.010	mg/L	0.00008	mg/L	20000323	C	Y	1.0	mg/L	75	125	20	C	Y	1.0	mg/L	75	125	20
2281	Selenium	0.020	mg/L	0.0017	mg/L	20000323	C	Y	1.0	mg/L	75	125	20	C	Y	1.0	mg/L	75	125	20
2285	Silver	0.010	mg/L	0.00003	mg/L	20000323	C	Y	0.25	mg/L	75	125	20	C	Y	0.25	mg/L	75	125	20

NA

Page number 1

(1) RL (Reportable Limit) is the PQL

Table 32. Method 7470a Cold Vapor Practical Quantitation Limits[1]

STL Reference Data Summary

Structured Analysis Code: I-0M-O8-01-07

Target Analyte List: All Analytes

Matrix: WATER
Extraction: TCLP(1311) -> METALS, TOTAL (Method exclusive)
Method: Mercury (7470A, Cold Vapor) - Liquid
QC Program: STANDARD TEST SET
Location: STL Sacramento

Analyte List		Detection Limits					Check List 20985						Spike List 20987					
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
1701	Mercury	0.002	mg/L	0.002	mg/L	19980214		Y	0.005	mg/L	76	117	19		Y	0.005	mg/L	76	117	19

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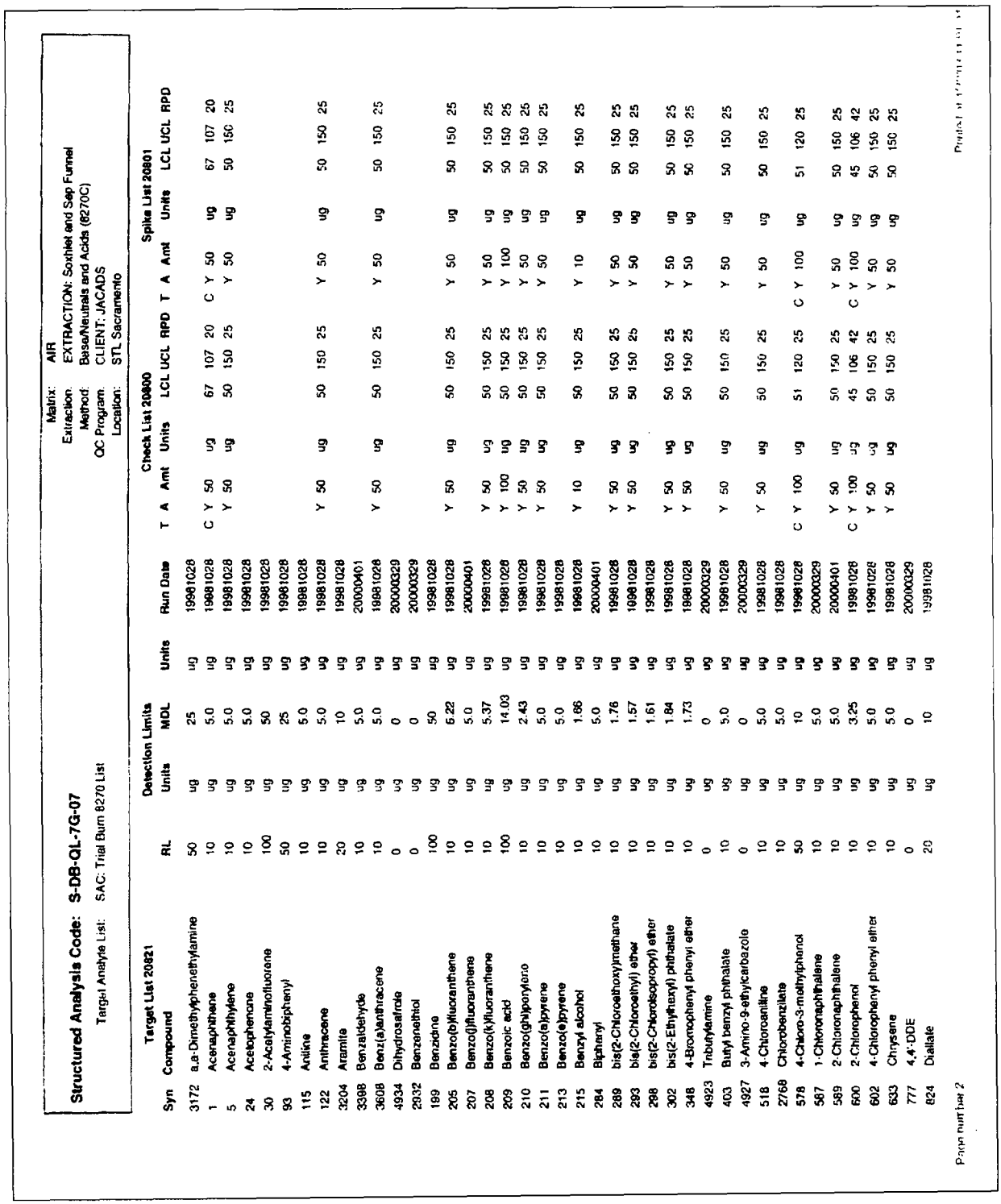
(1) RL (Reportable Limit) is the PQL

Table 33. Method 8270c Air Matrix Practical Quantitation Limits[1]



Structured Analysis Code: S-DB-QL-7G-07

Target Analyte List: SAC: Trial Burn 8270 List

Matrix: AIR
Extraction: EXTRACTION: Soxhlet and Sep Funnel
Method: Base/Neutrals and Acids (8270C)
QC Program: CLIENT: JACADS
Location: STL Sacramento

	Target List 20821		Detection Limits			Check List 20800										Spike List 20801					
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
3172	a,a-Dimethylphenethylamine	50	ug	25	ug	19981028														
1	Acenaphthene	10	ug	5.0	ug	19981028	C	Y	50	ug	67	107	20	C	Y	50	ug	67	107	20
5	Acenaphthylene	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
24	Acetophenone	10	ug	5.0	ug	19981028														
30	2-Acetylaminofluorene	100	ug	50	ug	19981028														
93	4-Aminobiphenyl	50	ug	25	ug	19981028														
115	Aniline	10	ug	5.0	ug	19981028														
122	Anthracene	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
3204	Aramite	20	ug	10	ug	19981028														
3398	Benzaldehyde	10	ug	5.0	ug	20000401														
3608	Benz(a)anthracene	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
4934	Dihydrosafrole	0	ug	0	ug	20000329														
2932	Benzenethiol	0	ug	0	ug	20000329														
199	Benzidine	100	ug	50	ug	19981028														
205	Benzo(b)fluoranthene	10	ug	6.22	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
207	Benzo(j)fluoranthene	10	ug	5.0	ug	20000401														
208	Benzo(k)fluoranthene	10	ug	5.37	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
209	Benzoic acid	100	ug	14.03	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
210	Benzo(ghi)perylene	10	ug	2.43	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
211	Benzo(a)pyrene	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
213	Benzo(e)pyrene	10	ug	5.0	ug	19981028														
215	Benzyl alcohol	10	ug	1.86	ug	19981028		Y	10	ug	50	150	25		Y	10	ug	50	150	25
284	Biphenyl	10	ug	5.0	ug	20000401														
289	bis(2-Chloroethoxy)methane	10	ug	1.76	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
293	bis(2-Chloroethyl) ether	10	ug	1.57	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
298	bis(2-Chloroisopropyl) ether	10	ug	1.61	ug	19981028														
302	bis(2-Ethylhexyl) phthalate	10	ug	1.84	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
348	4-Bromophenyl phenyl ether	10	ug	1.73	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
4923	Tributylamine	0	ug	0	ug	20000329														
403	Butyl benzyl phthalate	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
4927	3-Amino-9-ethylcarbazole	0	ug	0	ug	20000329														
518	4-Chloroaniline	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
2768	Chlorobenzilate	10	ug	5.0	ug	19981028														
578	4-Chloro-3-methylphenol	50	ug	10	ug	19981028	C	Y	100	ug	51	120	25	C	Y	100	ug	51	120	25
587	1-Chloronaphthalene	10	ug	5.0	ug	20000329														
589	2-Chloronaphthalene	10	ug	5.0	ug	20000401		Y	50	ug	50	150	25		Y	50	ug	50	150	25
600	2-Chlorophenol	10	ug	3.25	ug	19981028	C	Y	100	ug	45	106	42	C	Y	100	ug	45	106	42
602	4-Chlorophenyl phenyl ether	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
633	Chrysene	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
777	4,4'-DDE	0	ug	0	ug	20000329														
824	Diallate	20	ug	10	ug	19981028														

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(1) RL (Reportable Limit) is the PQL

Table 33. Method 8270c Air Matrix Practical Quantitation Limits (Continued)

Structured Analysis Code: S-DB-QL-7G-07

Target Analyte List: SAC: Trial Burn 8270 List

Matrix: AIR
Extraction: EXTRACTION: Soxhlet and Sep Funnel
Method: Base/Neutrals and Acids (8270C)
QC Program: CLIENT: JACADS
Location: STL Sacramento

Target List 20821			Detection Limits				Check List 20800							Spike List 20801						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
859	Dibenz(a,j)acridine	20	ug	10	ug	19981028														
860	Dibenz(a,h)anthracene	10	ug	2.29	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
863	Dibenzofuran	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
3260	1,2-Dibromo-3-chloropropane (DBCP)	0	ug	0	ug	20000329														
891	Di-n-butyl phthalate	10	ug	2.74	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
904	1,2-Dichlorobenzene	10	ug	2.05	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
907	1,3-Dichlorobenzene	10	ug	2.03	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
910	1,4-Dichlorobenzene	10	ug	2.0	ug	19981028	C	Y	50	ug	50	96	42	C	Y	50	ug	50	96	42
918	3,3'-Dichlorobenzidine	20	ug	5.0	ug	19981028														
971	2,4-Dichlorophenol	10	ug	2.98	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
973	2,6-Dichlorophenol	10	ug	5.0	ug	19981028														
1062	Diethyl phthalate	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
4930	N,N'-Diisopropylcarbodiimide	0	ug	0	ug	20000329														
4266	Diisopropylmethylphosphonate	0	ug	0	ug	20000329														
1110	p-Dimethylaminoazobenzene	20	ug	10	ug	19981028														
1120	7,12-Dimethylbenz(a)anthracene	20	ug	10	ug	19981028														
1124	3,3'-Dimethylbenzidine	50	ug	25	ug	19981028														
1145	2,4-Dimethylphenol	10	ug	5.0	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
1149	Dimethyl phthalate	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1164	1,3-Dinitrobenzene	10	ug	5.0	ug	19981028														
1167	4,6-Dinitro-2-methylphenol	50	ug	22.29	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
1187	2,4-Dinitrophenol	50	ug	10	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
1191	2,4-Dinitrotoluene	10	ug	5.0	ug	19981028	C	Y	50	ug	67	116	19	C	Y	50	ug	67	116	19
1193	2,6-Dinitrotoluene	10	ug	1.01	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1196	2-sec-Butyl-4,6-dinitrophenol	20	ug	10	ug	20000401														
1162	Di-n-octyl phthalate	10	ug	3.98	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1202	Dioxathion	0	ug	0	ug	20000329														
1212	Diphenylamine	10	ug	0	ug	20000329														
1214	1,2-Diphenylhydrazine	10	ug	5.0	ug	20000401														
1362	Ethyl methanesulfonate	10	ug	5.0	ug	19981028														
1414	Fluoranthene	10	ug	1.45	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1417	Fluorene	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1470	Heptachlor	0	ug	0	ug	20000329														
1482	Hexachlorobenzene	10	ug	1.49	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1489	Hexachlorobutadiene	10	ug	2.40	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1492	Hexachlorocyclopentadiene	50	ug	25	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1497	Hexachloroethane	10	ug	1.86	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1501	Hexachlorophene	0	ug	0	ug	20000329														
1511	Hexachloropropene	10	ug	5.0	ug	19981028														
1535	Indeno(1,2,3-cd)pyrene	10	ug	2.12	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1566	Isophorone	10	ug	1.33	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25

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(1) RL (Reportable Limit) is the PQL

Table 33. Method 8270c Air Matrix Practical Quantitation Limits (Continued)

Structured Analysis Code: S-DB-QL-7G-07

Target Analyte List: SAC: Trial Burn 8270 List

Matrix: AIR
Extraction: EXTRACTION: Soxhlet and Sep Funnel
Method: Base/Neutrals and Acids (8270C)
QC Program: CLIENT: JACADS
Location: STL Sacramento

Target List 20621		Detection Limits					Check List 20800							Spike List 20801						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
1593	Isosafrole	20	ug	10	ug	19981028														
1724	Methapyrilene	50	ug	25	ug	19981028														
1741	Methoxychlor	0	ug	0	ug	20000329														
1796	3-Methylcholanthrene	20	ug	10	ug	19981028														
1799	Methylcyclohexane	0	ug	0	ug	20000329														
1825	Methyl methanesulfonate	10	ug	5.0	ug	19981028														
1829	2-Methylnaphthalene	10	ug	1.75	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
2044	2-Methyl-5-nitroaniline	0	ug	0	ug	19981028														
1851	2-Methylphenol	10	ug	6.24	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
1855	3-Methylphenol	50	ug	25	ug	19981028														
1857	4-Methylphenol	10	ug	6.95	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
1932	Naphthalene	10	ug	1.65	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1940	1,4-Naphthoquinone	50	ug	25	ug	19981028														
1944	1-Naphthylamine	10	ug	5.0	ug	19981028														
1949	2-Naphthylamine	10	ug	5.0	ug	19981028														
3289	5-Nitroacenaphthene	0	ug	0	ug	20000329														
1960	2-Nitroaniline	50	ug	1.56	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
1964	3-Nitroaniline	50	ug	5.0	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
1968	4-Nitroaniline	50	ug	25	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
1972	Nitrobenzene	10	ug	1.84	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
1998	2-Nitrophenol	10	ug	3.43	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
2001	4-Nitrophenol	50	ug	10	ug	19981028	C	Y	100	ug	10	132	155	C	Y	100	ug	10	132	155
2006	4-Nitroquinoline-1-oxide	100	ug	50	ug	19981028														
2009	N-Nitrosodi-n-butylamine	10	ug	5.0	ug	19981028														
2013	N-Nitrosodiethylamine	10	ug	5.0	ug	19981028														
2018	N-Nitrosodimethylamine	10	ug	5.0	ug	19981028		Y	50	ug	20	130	20		Y	50	ug	20	130	20
2028	N-Nitrosodiphenylamine	10	ug	1.68	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
2024	N-Nitrosodi-n-propylamine	10	ug	1.19	ug	19981028	C	Y	50	ug	56	107	32	C	Y	50	ug	56	107	32
2031	N-Nitrosomethylethylamine	10	ug	5.0	ug	19981028														
2034	N-Nitrosomorpholine	10	ug	5.0	ug	19981028														
2036	N-Nitrosopiperidine	10	ug	5.0	ug	19981028														
2038	N-Nitrosopyrrolidine	10	ug	5.0	ug	19981028														
2046	5-Nitro-o-toluidine	0	ug	0	ug	19981028														
2074	Ethyl parathion	0	ug	0	ug	19981028														
2104	Pentachlorobenzene	10	ug	5.0	ug	19981028														
2108	Pentachloroethane	50	ug	25	ug	19981028														
2112	Pentachloronitrobenzene	50	ug	25	ug	19981028														
2118	Pentachlorophenol	50	ug	18.85	ug	19981028	C	Y	100	ug	10	138	200	C	Y	100	ug	10	138	200
2148	Phenacetin	20	ug	10	ug	19981028														
2154	Phenanthrene	10	ug	5.0	ug	19981028		Y	50	ug	50	150	25		Y	50	ug	50	150	25
2155	Phenol	50	ug	10	ug	19981028	C	Y	100	ug	10	129	46	C	Y	100	ug	10	129	46

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(1) RL (Reportable Limit) is the PQL

Table 33. Method 8270c Air Matrix Practical Quantitation Limits (Continued)

Structured Analysis Code: S-DB-QL-7G-07

Target Analyte List: SAC: Trial Burn 8270 List

Matrix: AIR
Extraction: EXTRACTION: Soxhlet and Sep Funnel
Method: Base/Neutrals and Acids (8270C)
QC Program: CLIENT: JACADS
Location: STL Sacramento

Target List 26821		Detection Limits					Check List 26800							Spike List 26801						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
3269	1,4-Phenylenediamine	100	ug	50	ug	19981028														
2206	2-Picoline	20	ug	10	ug	19981028														
2221	Pronamide	20	ug	10	ug	19981028														
2252	Pyrene	10	ug	2.31	ug	19981028	C	Y	50	ug	71	147	34	C	Y	50	ug	71	147	34
2256	Pyridine	20	ug	10	ug	19981028														
3477	Quinoline	0	ug	0	ug	20010514														
2275	Safrole	20	ug	10	ug	19981028														
2430	1,2,4,5-Tetrachlorobenzene	10	ug	5.0	ug	19981028														
2457	2,3,4,6-Tetrachlorophenol	50	ug	25	ug	19981028														
1786	o-Toluidine	10	ug	5.0	ug	20000329														
1794	p-Toluidine	0	ug	0	ug	20000329														
2515	1,2,4-Trichlorobenzene	10	ug	2.14	ug	19981028	C	Y	50	ug	54	102	33	C	Y	50	ug	54	102	33
2555	2,4,5-Trichlorophenol	10	ug	5.0	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
2559	2,4,6-Trichlorophenol	50	ug	10	ug	19981028		Y	100	ug	50	150	25		Y	100	ug	50	150	25
2597	1,3,5-Trinitrobenzene	50	ug	25	ug	19981028														
1425	2-Fluorobiphenyl						X	Y	50	ug	46	119	0	X	Y	50	ug	46	119	0
1426	2-Fluorophenol						X	Y	100	ug	23	114	0	X	Y	100	ug	23	114	0
2512	2,4,6-Tribromophenol						X	Y	100	ug	34	143	0	X	Y	100	ug	34	143	0
2736	Nitrobenzene-d5						X	Y	50	ug	37	115	0	X	Y	50	ug	37	115	0
2737	Phenol-d5						X	Y	100	ug	11	129	0	X	Y	100	ug	11	129	0
2738	Terphenyl-d14						X	Y	50	ug	49	136	0	X	Y	50	ug	49	136	0
2854	2-Chlorophenol-d4						X	Y	100	ug	20	130	0	X	Y	100	ug	20	130	0
2855	1,2-Dichlorobenzene-d4						X	Y	50	ug	16	118	0	X	Y	50	ug	16	118	0
4191	Benzo(a)pyrene-d12						X	Y	100	ug	40	150	0	X	Y	100	ug	40	150	0
4197	Fluoranthene-d10						X	Y	100	ug	40	150	0	X	Y	100	ug	40	150	0

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(1) RL (Reportable Limit) is the PQL

Table 34. Method 8270c Water Matrix Practical Quantitation Limits[1]

Structured Analysis Code: I-62-QL-01-07

Target Analyte List: SAC: 8270C TCLP LIST

Matrix: WATER
Extraction: TCLP(1311) -> LIQ/LIQ, SEP FUNNEL - Acid->Base
Method: Base/Neutrals and Acids (8270C)
QC Program: STANDARD TEST SET
Location: STL Sacramento

Target List 20803			Detection Limits				Check List 20808							Spike List 20809						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
910	1,4-Dichlorobenzene	50	ug/L	3.75	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
1191	2,4-Dinitrotoluene	50	ug/L	25	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
1482	Hexachlorobenzene	50	ug/L	5.0	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
1489	Hexachlorobutadiene	50	ug/L	25	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
1497	Hexachloroethane	50	ug/L	25	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
1851	2-Methylphenol	50	ug/L	9.0	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
2777	3-Methylphenol & 4-Methylphenol	50	ug/L	7.5	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
1972	Nitrobenzene	50	ug/L	5.5	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
2118	Pentachlorophenol	250	ug/L	90	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
2256	Pyridine	100	ug/L	50	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
2555	2,4,5-Trichlorophenol	50	ug/L	8.5	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
2559	2,4,6-Trichlorophenol	50	ug/L	9.0	ug/L	19980901	C	Y	500	ug/L	50	150	50	C	Y	500	ug/L	50	150	50
1425	2-Fluorobiphenyl						X	Y	500	ug/L	33	111	0	X	Y	500	ug/L	33	111	0
1426	2-Fluorophenol						X	Y	500	ug/L	10	74	0	X	Y	500	ug/L	10	74	0
2512	2,4,6-Tribromophenol						X	Y	500	ug/L	18	140	0	X	Y	500	ug/L	18	140	0
2736	Nitrobenzene-d5						X	Y	500	ug/L	34	103	0	X	Y	500	ug/L	34	103	0
2737	Phenol-d5						X	Y	500	ug/L	10	54	0	X	Y	500	ug/L	10	54	0
2738	Terphenyl-d14						X	Y	500	ug/L	30	134	0	X	Y	500	ug/L	30	134	0

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(1) RL (Reportable Limit) is the PQL

Table 35. Method 9057 Practical Quantitation Limits[1]

Structured Analysis Code: S-ED-M8-3V-07

Target Analyte List: All Analytes

Matrix: AIR
Extraction: DIRECT ANALYSIS: Airtrains, H2SO4
Method: Hydrogen Chloride Emissions (9057)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

Analyte List		Detection Limits					Check List 20049							Spike List 20050						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
2705	Hydrochloric acid	0.51	mg	0.257	mg	19990324	C	Y	5.0	mg	90	110	10	C	Y	5.0	mg	75	125	20

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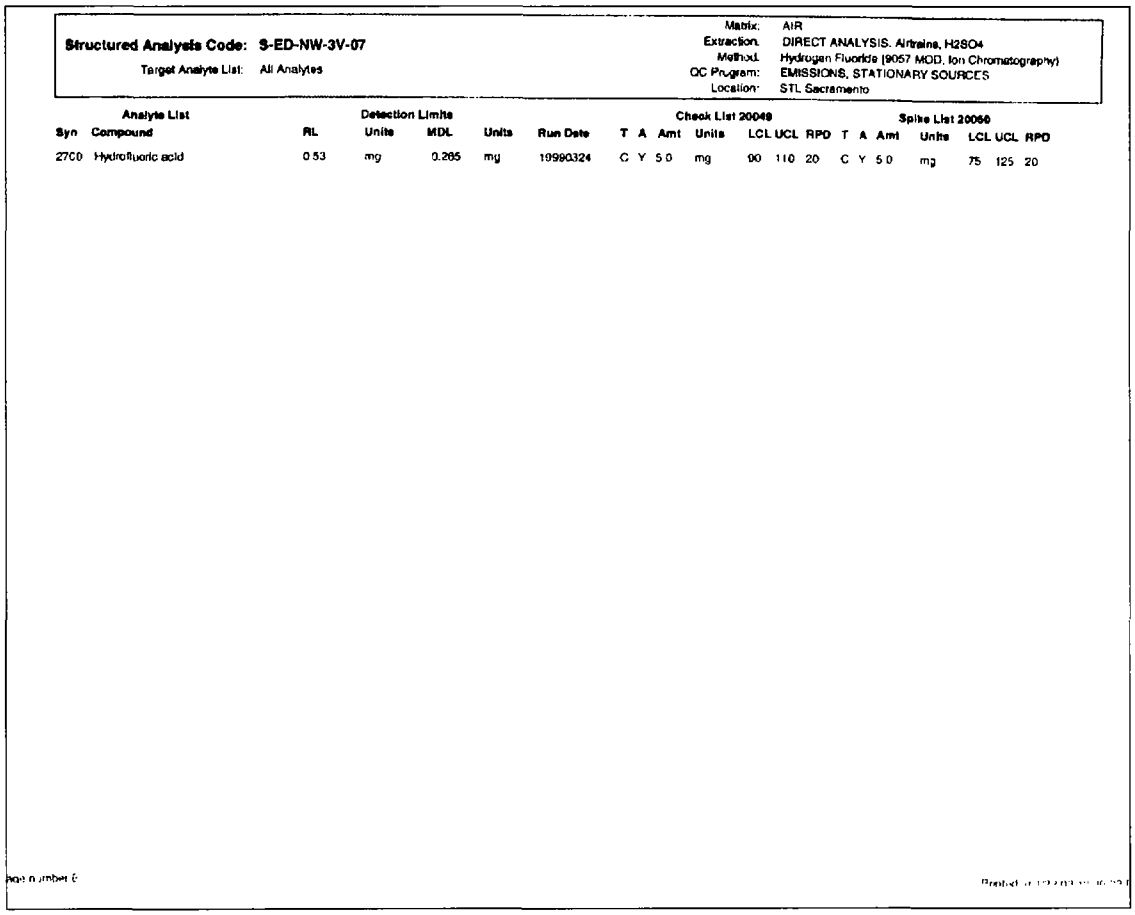
(1) RL (Reportable Limit) is the PQL

Table 36. Method 9057 Mod, Ion Chromatography Practical Quantitation Limit[1]



Structured Analysis Code: S-ED-NW-3V-07
Target Analyte List: All Analytes

Matrix: AIR
Extraction: DIRECT ANALYSIS. Airtrains, H2SO4
Method: Hydrogen Fluoride (9057 MOD, Ion Chromatography)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

Analyte List		Detection Limits					Check List 20049							Spike List 20060						
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
2700	Hydrofluoric acid	0.53	mg	0.265	mg	19990324	C	Y	5.0	mg	90	110	20	C	Y	5.0	mg	75	125	20

(1) RL (Reportable Limit) is the PQL

Table 37. Method 9057 Ion Cromatography Practical Quantitation Limit[1]

Structured Analysis Code: S-EG-PC-3V-07

Target Analyte List: All Analytes

Matrix: AIR
Extraction: DIRECT ANALYSIS: Airbains, NaOH
Method: Chlorine Emissions (9057 Ion Chromatography)
QC Program: EMISSIONS, STATIONARY SOURCES
Location: STL Sacramento

Analyte List			Detection Limits				Check List 28049						Spike List 28050					
Syn	Compound	RL	Units	MDL	Units	Run Date	T	A	Amt	Units	LCL	UCL	RPD	T	A	Amt	Units	LCL	UCL	RPD
515	Chlorine	1.0	mg	0.25	mg	19990324	C	Y	5.0	mg	90	110	10	C	Y	5.0	mg	75	125	20

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(1) RL (Reportable Limit) is the PQL

Table 38. Method 0023a/8290 Practical Quantitation Limits

Method 0023A/8290 Target Detection Limits

	Detection Limit
	pg/sample
2,3,7,8-TCDD	10
Total TCDD	10
1,2,3,7,8-PeCDD	50
Total PeCDD	50
1,2,3,4,7,8-HxCDD	50
1,2,3,6,7,8-HxCDD	50
1,2,3,7,8,9-HxCDD	50
Total HxCDD	50
1,2,3,4,6,7,8-HpCDD	50
Total HpCDD	50
OCDD	100
2,3,7,8-TCDF	10
Total TCDF	10
1,2,3,7,8-PeCDF	50
2,3,4,7,8-PeCDF	50
Total PeCDF	50
1,2,3,4,7,8-HxCDF	50
1,2,3,6,7,8-HxCDF	50
2,3,4,6,7,8-HxCDF	50
1,2,3,7,8,9-HxCDF	50
Total HxCDF	50
1,2,3,4,6,7,8-HpCDF	50
1,2,3,4,7,8,9-HpCDF	50
Total HpCDF	50
OCDF	100

DLs based on 2 way split of extract using one-half for analysis and one-half for archive.

Table 39. Method 8260b Practical Quantitation Limits(1)

Apr-22-2003 03:21pm From-STL KNOXVILLE 8655844315 T-973 P 002/004 F-545

STL Detection Limit Summary

Target Analyte List: Q: TCLP MSVOA Standard List
Method: Volatile Organics, GC/MS (8260B)
Extraction: TCLP(1311-ZHE/filter) -> PURGE-AND-TRAP (Low Level)

Matrix: WATER
QC Program: STANDARD TEST SET
Location: STL Knoxville

Analyte List Constituent	Detection Limits RL	Units	MDL	Units
Benzene	0.050	mg/L	0.005	mg/L
Methyl ethyl ketone	0.20	mg/L	0.020	mg/L
Carbon tetrachloride	0.050	mg/L	0.005	mg/L
Chlorobenzene	0.050	mg/L	0.005	mg/L
Chloroform	0.050	mg/L	0.005	mg/L
1,2-Dichloroethane	0.050	mg/L	0.005	mg/L
1,1-Dichloroethylene	0.050	mg/L	0.006	mg/L
Tetrachloroethylene	0.050	mg/L	0.008	mg/L
Trichloroethylene	0.050	mg/L	0.005	mg/L
Vinyl chloride	0.10	mg/L	0.009	mg/L
Bromofluorobenzene				
1,2-Dichloroethane-d4				
Toluene-d8				
Dibromofluoromethane				

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(1) RL (Reportable Limit) is the PQL

Table 40. Method TCO Practical Quantitation Limits[1]

Apr-22-2003 03:21pm From-STL KNOXVILLE 8655844315 T-973 P 003/004 F-545

STL Detection Limit Summary

Target Analyte List: All Analytes
Method: Total Chromatographable Organics (TCO) Analysis
Extraction: SOXHLET (NOMINAL), Aintrains Combined

Matrix: AIR
QC Program: STANDARD TEST SET
Location: STL Knoxville

Analyte List Constituent	Detection Limits RL	Units	MDL	Units
Total Chromatographable Organics	0.150	mg	0.017	mg
n-Eicosane				
n-Heptadecane				

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(1) RL (Reportable Limit) is the PQL

Table 41. Method Grav Practical Quantitation Limit(1)

Apr-22-2003 03:21pm From-STL KNOXVILLE 8655844315 T-973 P 004/004 F-545

STL Detection Limit Summary

Target Analyte List: All Analytes
Method: Gravimetric Analysis (GRAV)
Extraction: SOXHLET (NOMINAL), Aliquots Combined

Matrix: AIR
QC Program: STANDARD TEST SET
Location: STL Knoxville

Analyte List Constituent	Detection Limits RL	Units	MDL	Units
Total Gravimetric Organics	1.5	mg	0.68	mg

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(1) RL (Reportable Limit) is the PQL